

## **Engineering Design File**

Project No. 23927

# **Waste Inventory Estimate for the Accelerated Retrieval Project II**

**Idaho  
Cleanup  
Project**

The Idaho Cleanup Project is operated for the  
U.S. Department of Energy by CH2M ♦ WG Idaho, LLC

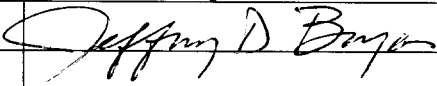
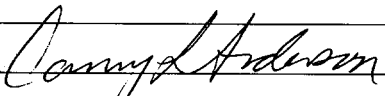
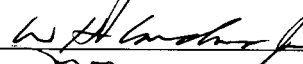

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<p>5. Summary:</p> <p>This engineering design file summarizes information on the weights, volumes, and transuranic activities, by waste type, of waste disposed of in the retrieval area selected for Phase II of the Accelerated Retrieval Project (ARP II). This retrieval area (formerly Area H) includes portions of Pits 4 and 6 and lies immediately to the east of the ARP I retrieval area (Pit 4). The ARP I and ARP II retrieval areas together encompass the whole of Subsurface Disposal Area Retrieval Area #1 as described in the U.S. Department of Energy Idaho Operations Office request for proposal for the Idaho Cleanup Project contract. The ARP II retrieval area contains Rocky Flats Plant (RFP) waste shipments dated from August 1966 to April 1968. The ARP II retrieval area also contains waste shipments from on-Site generators (i.e., from the Idaho National Laboratory) dated from February 1963 to September 1967.</p> <p>This revision updates the buried waste inventory estimate to reflect corrected retrieval area coordinates. The estimated weights and as-disposed volumes (by waste type) of waste shipments within the ARP II retrieval area are summarized below.</p> <table border="1"> <thead> <tr> <th>Waste Category</th> <th>Weight (lb)</th> <th>Volume (ft<sup>3</sup>)</th> </tr> </thead> <tbody> <tr> <td>RFP Series 741 sludge</td> <td>309,412</td> <td>4,520</td> </tr> <tr> <td>RFP Series 742 sludge</td> <td>679,016</td> <td>10,189</td> </tr> <tr> <td>RFP Series 743 sludge</td> <td>2,210,618</td> <td>27,969</td> </tr> <tr> <td>RFP Series 744 sludge</td> <td>166,775</td> <td>2,757</td> </tr> <tr> <td>RFP Series 745 sludge</td> <td>661,656</td> <td>11,934</td> </tr> <tr> <td>RFP miscellaneous sludge (746 and 776)</td> <td>1,180</td> <td>28</td> </tr> <tr> <td>RFP beryllium</td> <td>20,070</td> <td>712</td> </tr> <tr> <td>RFP roaster oxide</td> <td>145,149</td> <td>1,646</td> </tr> <tr> <td>RFP graphite</td> <td>469</td> <td>10</td> </tr> <tr> <td>RFP filters</td> <td>60,477</td> <td>5,566</td> </tr> <tr> <td>RFP line-generated waste</td> <td>25,996</td> <td>1,291</td> </tr> <tr> <td>RFP combustible debris</td> <td>646,425</td> <td>37,347</td> </tr> <tr> <td>RFP noncombustible debris</td> <td>902,188</td> <td>54,486</td> </tr> <tr> <td>Non-RFP sludge</td> <td>2,500</td> <td>59</td> </tr> <tr> <td>Non-RFP combustible debris</td> <td>0<sup>a</sup></td> <td>37</td> </tr> <tr> <td>Non-RFP noncombustible debris</td> <td>99,717</td> <td>5,419</td> </tr> <tr> <td><b>Totals</b></td> <td><b>5,931,648</b></td> <td><b>163,970</b></td> </tr> </tbody> </table> <p>a. No weight data available.</p>			Waste Category	Weight (lb)	Volume (ft <sup>3</sup> )	RFP Series 741 sludge	309,412	4,520	RFP Series 742 sludge	679,016	10,189	RFP Series 743 sludge	2,210,618	27,969	RFP Series 744 sludge	166,775	2,757	RFP Series 745 sludge	661,656	11,934	RFP miscellaneous sludge (746 and 776)	1,180	28	RFP beryllium	20,070	712	RFP roaster oxide	145,149	1,646	RFP graphite	469	10	RFP filters	60,477	5,566	RFP line-generated waste	25,996	1,291	RFP combustible debris	646,425	37,347	RFP noncombustible debris	902,188	54,486	Non-RFP sludge	2,500	59	Non-RFP combustible debris	0 <sup>a</sup>	37	Non-RFP noncombustible debris	99,717	5,419	<b>Totals</b>	<b>5,931,648</b>	<b>163,970</b>
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Site Area		<u>RWMC</u>		
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# Waste Inventory Estimate for the Accelerated Retrieval Project II

## 1. INTRODUCTION

The Radioactive Waste Management Complex (RWMC) at the Idaho National Laboratory (INL) was used for subsurface disposal of transuranic (TRU) waste in various pits and trenches of the Subsurface Disposal Area (SDA) from 1952 until 1970, when the practice was suspended in favor of aboveground, retrievable storage. Low-level waste (LLW) from the INL and elsewhere was also disposed of in these pits and trenches. As part of a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC § 9601 et seq., 1980) non-time critical removal action (NTCRA), the U.S. Department of Energy proposes to retrieve some of this waste from the SDA. Phase I of the Accelerated Retrieval Project (ARP I) is retrieving and processing certain Rocky Flats Plant (RFP) waste forms (termed “targeted waste”) from a described area within Pit 4 of the SDA within the RWMC. Waste forms targeted for retrieval include waste suspected to contain high levels of TRU contaminants or other contaminants of concern for the SDA.<sup>a</sup> Phase II of the ARP (ARP II) will also be performed as a NTCRA and will extend the ARP I retrieval area to the east to encompass the remainder of SDA Retrieval Area #1 as described in the Department of Energy Idaho Operations Office request for proposal for the Idaho Cleanup Project (ICP) contract. This engineering design filed (EDF) addresses the disposed waste contained in the extension area to the east of the ARP I described area, hereafter referred to as the ARP II retrieval area. Information in this EDF supports planning for the amount of CERCLA waste to be generated by the NTCRA. The TRU activity estimates (i.e., by waste type) also allow the efficiency of the targeted waste visual identification approach to be calculated.<sup>b</sup>

## 2. SITE LOCATION

A study was conducted as part of the Pit 9 Stage III Project to evaluate and prioritize various areas of the SDA for possible removal of TRU contamination and collocated hazardous volatile organic compounds. These areas (A through J) were evaluated against a number of criteria (e.g., total TRU content, total volatile organic compound content, and accessibility). The ARP II retrieval area (formerly identified as Area H) was identified as the second highest priority after the ARP I Pit 4 described area. The ARP II retrieval area is located toward the center of the SDA and covers the east end of Pit 4 and the west end of Pit 6. Specific coordinates for the ARP II retrieval area are provided in Drawing #629816. As can be determined from these coordinates, the ARP II retrieval area is roughly rectangular with approximate dimensions: 248 ft (east-west) by 126 ft (north-south).

As stated above, the ARP I and ARP II rectangular, 1/2-acre retrieval areas fully encompass SDA Retrieval Area #1 from the ICP request for proposal. The SDA Retrieval Area #1 is a complex polygon that more closely fits around the area containing the highest TRU densities (in Ci/ft<sup>2</sup>). This EDF includes waste estimates for both the larger ARP II retrieval area as well as the eastern half of SDA Retrieval

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a. Specifically, the RFP waste streams that are targeted include Series 741 and 743 sludge, graphite waste, filter waste (including filter media), and depleted uranium roaster oxide.

b. The calculated efficiency (i.e., cumulative measured curies retrieved divided by the cumulative curies estimated to be in the area retrieved) will be, at best, an approximate value that is subject to multiple sources of error including, for example, the following data or processes: the accuracy of the SDA radionuclide inventory (as contained in the Contaminant Inventory Database for Risk Assessment), the representativeness of the TRU allocation scenario (by SDA Map Builder Application [SMB]), the accuracy of the disposed waste locations (in the Waste Information and Location Database), the accuracy of waste type assignments (in WILD based on trailer load list reviews and data entry), and the accuracy of retrieved waste nondestructive assay measurements.

Area #1. Thus, a number of different what-if scenarios can be examined relative to the approach to be used by CH2M-WG Idaho, LLC, the ICP contractor, for retrieving the targeted waste contained in SDA Retrieval Area #1.

### 3. WASTE DISPOSAL INFORMATION AND ESTIMATE DEVELOPMENT

Both TRU waste and LLW were disposed of in the ARP II retrieval area. Waste was generally buried from west to east over time. The majority of waste came from the RFP near Denver, Colorado, and has varying levels of TRU contamination. The LLW came from various INL generators. For Pits 4 and 6, the disposal process historically involved excavating an area in the SDA to the outcroppings of the basalt bedrock, backfilling the area with 2 ft (nominally) of soil, and disposing of the waste containers in a random fashion. While some stacked waste drums were present in the west end of the ARP I retrieval area, no containers were stacked in the ARP II retrieval area.

Disposal sheets for non-RFP shipments and trailer load lists for the RFP shipments are the ultimate source for the disposal locations and waste type designations (Clements 1982). These sheets are presently maintained in the Operable Unit (OU) 13/14 Project file, which is located in the Technical Support Building in Idaho Falls. The disposal sheets are also available from INL Optical Imaging System with links from Electronic Document Management System. The disposal location and, in most cases, the footprint that the disposed containers covered, were recorded for each shipment. For instance, some disposal records simply identify a point measured from a pit corner monument (e.g., 50 ft west of the northeast monument) while others provide a range in two directions for the area covered by the disposal after dumping (e.g., 300 to 310 ft west and 70 to 90 ft north of the southeast monument). The trailer load lists (for RFP shipments) and the disposal sheets also identify weights and volumes for the shipments (in most cases), but provide little information on the radioactive content in the shipment.

The information from the original shipments has previously been transferred to the INL Waste Information and Location Database (WILD), from which reports for the ARP II retrieval area were obtained. This EDF is based strictly on the WILD data (as of May 5, 2005) for shipments intersecting the ARP II retrieval area including waste type assignments, total shipment weights, and total shipment volumes. Typically, a shipment would contain various types of waste from various generators (e.g., buildings at RFP). The RFP-generated waste was divided, on the trailer load lists, into general categories as shown in Table 1.

Table 1. Rocky Flats Plant waste types.

Type	Description
Type I	Combustibles (e.g., paper, rags, and wood)
Type II	Glass and ceramics
Type III	Chemical Warfare System and high-efficiency particulate air filters
Type IV	Sludges from coprecipitation treatment
Type V	Noncombustibles, scrap metal, and brick
Type VI	Empties (included in WILD as Type V)
Type VII	Series 743 sludge (included in WILD as Type IV)

WILD = Waste Information and Location Database

In developing the data for WILD, these types were converted to more descriptive categories based on additional information such as the RFP building designators and knowledge of the operations in those buildings. The waste categories used in WILD are described below. The descriptions of the various types of sludge were taken from Clements (1982).

- Series 741 sludge, also called first-stage sludge: Series 741 sludge was produced from aqueous waste from various plutonium recovery operations. The process produced a precipitate of hydrated oxides of iron, magnesium, aluminum, and silicon that also carried some hydrate plutonium and americium oxides. The precipitates were filtered to produce a sludge containing 50 to 70 wt% water. The water was absorbed, to some extent, by the addition of Portland cement.
- Series 742 sludge, also called second-stage sludge: Series 742 sludge was generated in a fashion similar to the Series 741 sludge from various RFP aqueous streams that were lower in TRU content than the streams generating the Series 741 sludge and generally contains lesser amounts of plutonium or americium.
- Series 743 sludge, also called organic setups: Series 743 sludge is very different from the Series 741 and 742 types of sludge. Series 743 sludge is the result of stabilizing various types of organic waste (e.g., carbon tetrachloride, trichloroethylene, tetrachloroethylene, Texaco Regal Oil, and other miscellaneous oils and degreasing agents). These types of liquid waste were mixed with calcium silicate to form a grease or paste-like substance. Waste containers designated as 74A on the trailer load lists are thought to be a precursor to the Series 743 sludge and are included in this category.
- Series 744 sludge, also called special setups: Series 744 sludge contains organic liquids that were stabilized with cement rather than calcium silicate. Containers of Series 744 sludge are expected to be firm monoliths.
- Series 745 sludge, also called evaporator salts: Series 745 sludge comprise nitrate salt residues from solar evaporation ponds that were used at one time at RFP. The chemical make-up of these salts is expected to be 60% sodium nitrate, 30% potassium nitrate, and 10% miscellaneous inorganic compounds. This waste stream was generated from the liquid effluent from the second stage treatment process and, as a result, expected to be very low in TRU content.
- Beryllium waste: Waste identified as coming from RFP buildings 444, 776, or 777 and designated on the trailer load lists as containing beryllium was categorized as beryllium waste. It is not clear whether this material was beryllium metal, other materials that were contaminated with beryllium, or a combination of the two.
- Roaster oxide waste: Some types of waste from RFP Building 444 were designated as roaster-oxide waste. This roaster-oxide waste is incinerated depleted uranium.
- Graphite waste: Graphite was used as molds for certain casting operations. The plutonium was recovered to the extent practical before the graphite was disposed of. Data from various studies and measurements indicate that this graphite waste may have some of the highest TRU contamination levels.
- Filters: This category is expected to contain the various high-efficiency particulate air filters. Other types of process filters may also be included in the shipments designated as filters in WILD.



- Line-generated waste: This category is expected to contain various waste materials removed from the plutonium-processing gloveboxes including items such as glovebox gloves, combustible waste, graphite, and filters.
- Combustible debris: Waste comprising paper, plastic, wood, and other combustible materials was designated as combustible debris.
- Metal debris: Waste that was predominantly metallic (e.g., pipe, equipment, conduit, and empty drums) was designated as metal debris.

These last two categories (i.e., combustible and metal debris) contained both RFP- and INL-generated waste. In addition, the waste disposed of in the ARP II retrieval area included miscellaneous sludge from the RFP and INL.

It was necessary to perform some reformatting and processing of the WILD data to generate the values in this estimate. First, some data processing was necessary due to the way that waste type information is stored in WILD. Specifically, records previously tracked in Waste-O-Scope as mixed waste types (e.g., shown as both Type I and Type V) have been replicated in WILD so that each record has only one waste type. The associated number of containers, weight, and volume is the same for each record (i.e., these parameters were not partitioned when the mixed waste type records were separated). Therefore, to prevent double counting in this estimate, an Excel-spreadsheet process was developed that would identify such instances (i.e., based on duplicate field values) and partition the weight and volume equally to the affected single-waste-type records. For example, if two WILD records have the same detail key and exactly the same weight, volume, and container count (indicating the split of a mixed-waste-type record), the associated weight and volume would be divided by two for each record. If there were three records with the same detail information (indicating that the containers held three waste types), the associated weight and volume was divided by three for each record. While the waste types were likely not equal in weight and volume, a simplifying assumption was necessary due to the lack of data on the actual distribution.

Second, some waste disposal footprints were adjusted from that provided by WILD (i.e., disposal location string). As discussed above, some disposal locations are identified by only one or two points rather than a rectangular range (four points) with respect to one of the pit corner monuments. These disposals are shown as circles or ellipses in associated Geographical Information System shape files, respectively. One option for representing the area of these nonrectangular disposals is to adjust the disposal area based on the shipment volume and the depth of the waste zone in the location of the disposal. For disposals containing a large volume of waste, this is desirable to ensure the “depth” of the shipment does not exceed the physical limits of the pit. It also provides a visual indication of how large the shipment was. However, for small disposals or for deeper sections of the pit, the areal footprint can be quite small—suggesting a positional accuracy that is not likely to be representative of the actual location. For this reason, the disposal shipments having only one locator point have been adjusted such that no disposal area is less than 100 ft<sup>2</sup> (e.g., a 10 × 10-ft square). This is consistent with anecdotal estimates of the positional accuracy of the disposal location information that was documented at the time the waste was buried. Also, the disposal area shapes for all disposals have been simplified to rectangles for this analysis.

The approximate locations of the disposal shipments within the ARP II retrieval area are depicted in Figure 1. Note that the waste shown in the last grid column on the right hand side has not been included in this estimate because the majority of this waste falls outside the ARP II retrieval area.

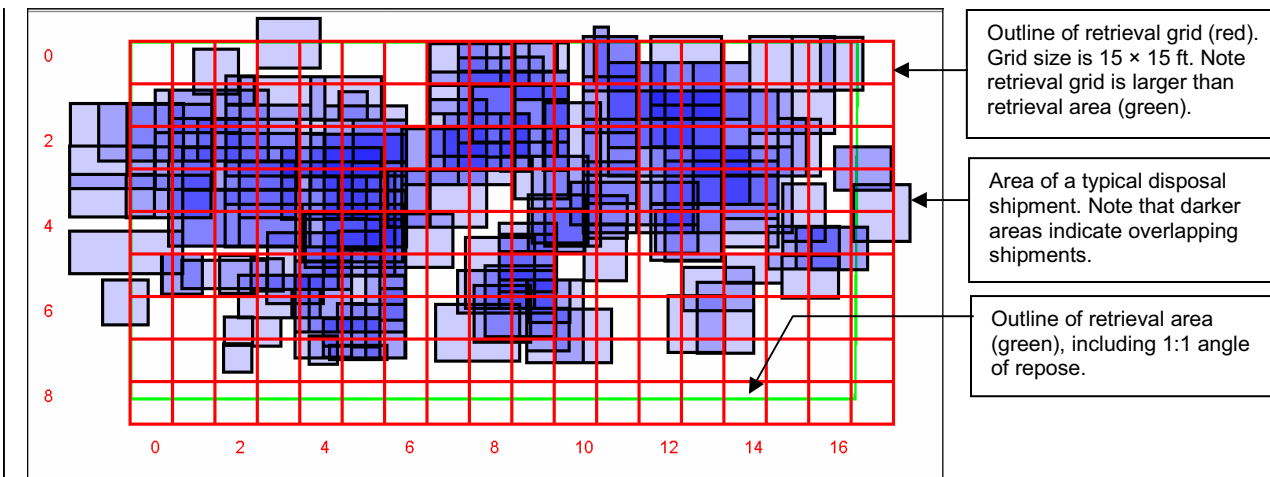


Figure 1. Approximate disposal shipment locations for the Accelerated Retrieval Project II retrieval area.

While not specifically identified in WILD, it was noted in the review of the disposal records that several shipments might pose difficulties for normal targeted waste retrieval operations. Information on these disposals is presented in Section 5.

Section 6 of this EDF provides an estimate of TRU activity (limited to Am-241, Pu-239 and Pu-240) by waste type. This estimate assists decision-makers in identifying potential waste forms that also may be efficient to target for removal as part of the NTCRA. This estimate also allows prediction of the average TRU activity concentration of the material remaining in the pit after removal of the targeted waste forms.

The complete process used to develop the volume, weight, and TRU activity estimates is diagrammed in Figure 2.

The functions described in Section 3.1 are performed by the spreadsheets and ARP II Model application (shown in Figure 2) that were developed to generate the volume, weight, and activity estimates contained in this EDF. The list below is not meant to be all encompassing, but identifies those functions that are primary to the generation of the estimates:

### 3.1 ARP II Inventory Processor.xls

#### 3.1.1 TRU Activity Processing and Summarization

- Uses a subset of the activity data, from the SDA Map Builder Application (SMBA)—limited to only those records that are applicable to the ARP II retrieval area.
- Creates a lookup key to uniquely identify isotopic activity allocation (in curies) for each shipment and RFP waste type. This lookup table is used later during the WILD shipment data processing (described below)
- Summarizes TRU isotopic activity allocation (i.e., Am-241, Pu-239, and Pu-240) by RFP disposal shipment. This summary provides a means to check that the spreadsheet is accounting for all the TRU activity allocated to each shipment by the SMBA
- Summarizes TRU isotopic activity allocation (i.e., Am-241, Pu-239, and Pu-240) by RFP waste type (e.g., Series 741 sludge, graphite, filters, and line-generated waste).

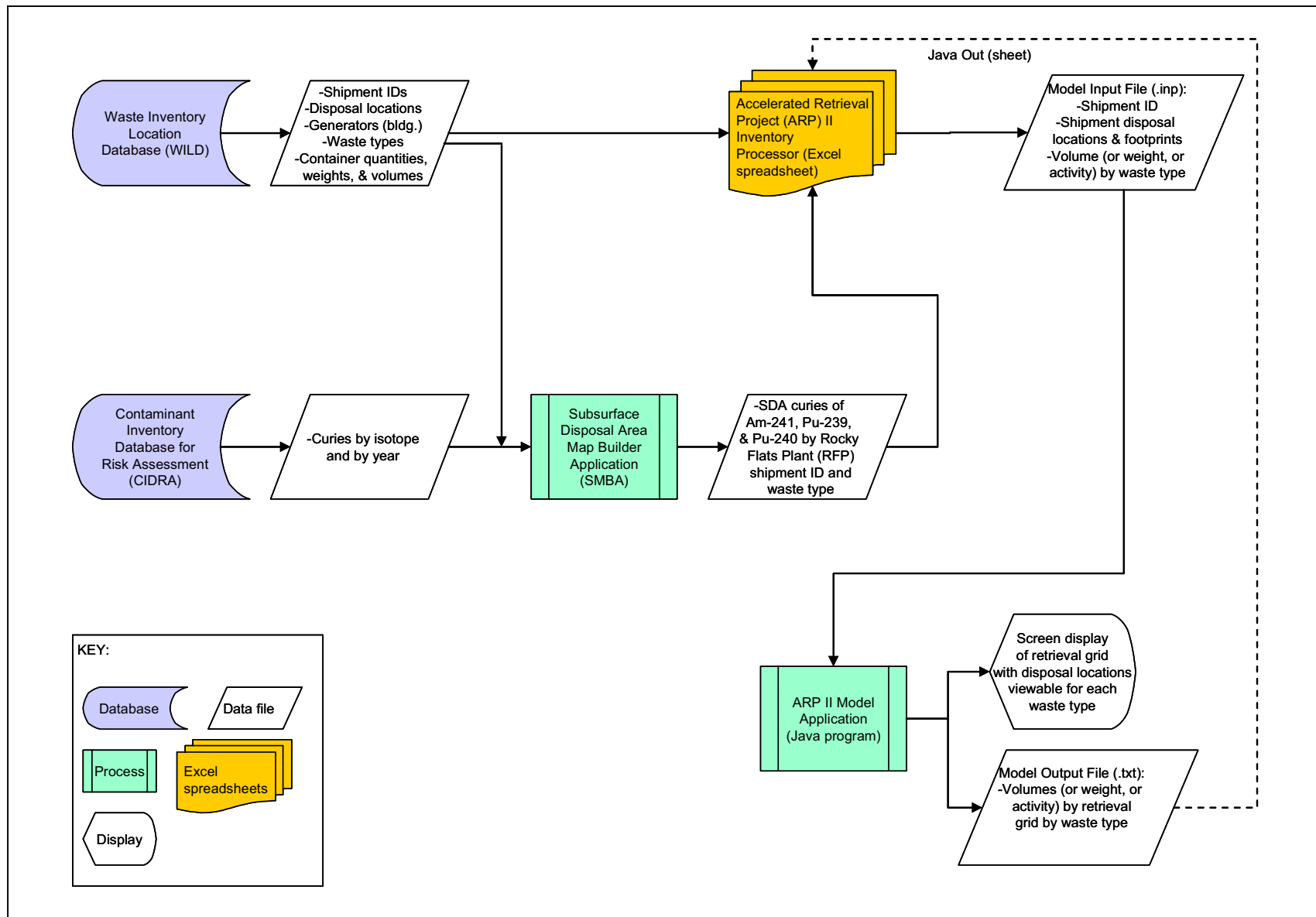


Figure 2. Diagram of data reduction and preparation process.

### 3.1.2 WILD Shipment Data Identification, Summarization, and Processing

- Allows user input to select between standard disposal footprints provided by WILD, 100 ft<sup>2</sup> for all circular disposals, or 100 ft<sup>2</sup> minimum for circular disposals. All disposal footprints are simplified to a rectangular shape for use by the ARP II Model (Java program).
- Detects WILD records for drums containing multiple waste types and uses user-defined rules to allocate drum volumes and weights between the identified waste types. This is to prevent double counting of the waste volumes and weights.
- Creates a lookup key so that waste volumes (or weights, or activities [from the TRU activity processing described above]) can be summarized by waste type for each shipment ID.
- Allows the creation of a drawing file (e.g., .dxf format) that can be used to check that the disposal-location data are converted correctly.
- Creates the text (.inp) file that is input for the ARP II Model (Java program). This file contains the disposal locations for each waste shipment and the associated volumes (or weights, or TRU activities) for each waste type.
- Provides a user interface to simplify data entry of retrieval-grid-input parameters for the execution of the ARP II Model (Java program).
- Pulls the ARP II Model (Java program) output (a .txt file) back into the spreadsheet for subsequent use and analysis.

### 3.2 ARP II Model.jar

- Draws a retrieval grid over the ARP II retrieval area based on parameters entered in the program's execution line.
- For each disposal record in the input file, this program partitions the waste volume (or weight, or TRU activity) by waste type into the applicable retrieval grids. For this partitioning, the volume (or weight, or TRU activity) for each waste type is assumed to be evenly distributed over the disposal footprint. For example if 40% of a shipment's disposal footprint lies within a retrieval grid, then 40% of the volume of each waste type contained in that shipment is placed within that retrieval grid.
- Creates an output text (.txt) file that identifies the total volume (or weight, or TRU activity) of each waste type contained within each retrieval grid location.
- Displays retrieval grid and disposal elements either for all shipments or by waste type (i.e., only the shipments containing the selected waste type).

*NOTE:* For this estimate, the dimensions of the retrieval grid were set at 15 ft wide by 15 ft high. This grid corresponds to the grid system laid out within the ARP I Retrieval Enclosure and as continued in the ARP II Retrieval Enclosure to support sampling activities. The depth of the retrieval grid has been set at 13 ft, which corresponds to the anticipated average depth of the waste zone (not including the overburden, potentially contaminated soil, and underburden layers).

## 4. WASTE VOLUME AND WEIGHT ESTIMATES

The WILD data contain the volume and weight of each disposal shipment. The volumes were, in most cases, the volumes of the containers, which were disposed. In other words, the volume of a 55-gal drum was recorded as “55 gal” (or 7.4 ft<sup>3</sup>). In some cases, however, the volume recorded was the volume of the container (e.g., dumpster), not the actual volume of the waste. Thus, the volume of waste in the various waste categories is thought to overestimate the actual as-disposed volume.<sup>c</sup> The weights were recorded in pounds. Appendix A contains a summary of waste types by disposal ID number for the waste inventory contained in the ARP II retrieval area, which includes the area of the angle of repose. In generating this estimate, the ARP II retrieval area was extended on the west end approximately 8.75 ft so that the retrieval grids would coincide with those established for the ARP I retrieval. Thus some overlap exists with the ARP I retrieval area in the angle of repose on the east side. No partitioning of the waste in the overlap area was attempted since the remaining material (i.e., below angle of repose) would be retrieved as part of the ARP II effort.

Waste was received in a number of container types, and in many cases the exact container type was not specified. Generally, however, all types of RFP-generated sludge were contained in 55-gal drums.<sup>d</sup>

The as-disposed weights and as-disposed volumes are shown in Table 2. As discussed previously, in Section 3, the weight and volume values obtained from WILD for the RFP waste required some processing to prevent double counting. This condition is due to certain containers being identified in the trailer load lists as holding combinations of waste types. WILD tracks each waste type separately, so the container count, weight, and volume data in each WILD record reflects the total container count, weight, and volume of the associated containers. Summing these values across waste types can thus cause double counting. The values in Table 2 below for weight and volume have been adjusted from the WILD values to prevent any double counting. Typically, an equal portion of the original weight and volume of the combined-waste-type containers is allocated to each waste type (e.g., one-half of the original volume and weight to each waste type if two waste types were present in the containers, one-third of the original volume and weight to each waste type if three waste types were present in the containers).

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c. While the actual volume of targeted waste is expected to be less than the disposed volume (i.e., because of voids within the disposal containers or crushing that may have occurred during pit disposal operations), it is expected that the retrieved and repackaged waste volume will be at least twice the original targeted waste disposed volume. This increase is due to factors such as mixing (with nontargeted waste and soil) during excavation and identification, expansion (swell), and allowances needed to ensure the waste and tray liner fit within the new drum. Such increases have already been observed from ARP I operations to date.

d. Based on ARP I experience to date (i.e., in grid row A), many of the drums that were disposed of in a stacked manner still have significant structural integrity. Later containers that were randomly dumped or that contained organic sludge may exhibit a greater level of degradation like those encountered during the OU 7-10 Glovebox Excavator Method Project.

Table 2. Summary of as-disposed volumes and weights for all shipments (or portions thereof) within the ARP II retrieval area (targeted waste forms are indicated).

Waste Category	Targeted (for retrieval)	Weight (lb)	Volume (ft <sup>3</sup> )
<b>RFP Series 741 sludge</b>	<b>X</b>	<b>309,412</b>	<b>4,520</b>
RFP Series 742 sludge		679,016	10,189
<b>RFP Series 743 sludge</b>	<b>X</b>	<b>2,210,618</b>	<b>27,969</b>
RFP Series 744 sludge		166,775	2,757
RFP Series 745 sludge		661,656	11,934
RFP miscellaneous sludge		1,180	28
RFP beryllium		20,070	712
<b>RFP roaster oxide</b>	<b>X</b>	<b>145,149</b>	<b>1,646</b>
<b>RFP graphite</b>	<b>X</b>	<b>469</b>	<b>10</b>
<b>RFP filters</b>	<b>X</b>	<b>60,477</b>	<b>5,566</b>
RFP line-generated waste		25,996	1,291
RFP combustible debris		646,425	37,347
RFP noncombustible debris		902,188	54,486
Non-RFP sludge		2,500	59
Non-RFP combustible debris		0 <sup>a</sup>	37
Non-RFP noncombustible debris		99,717	5,419
<b>Totals</b>		<b>5,931,648</b>	<b>163,970</b>

a. No weight data available.

These volumes and weights have been adjusted to account for disposal shipments that intersect the boundaries of the retrieval grid as shown in Figure 1 (with the exception of the easternmost column of grids which have not been included in this estimate). In other words, if only part of a disposal shipment was within the retrieval area, the fraction of the disposal shipment outside the retrieval area boundary was ignored. Even so, this estimate may slightly over-predict the amount of waste to be retrieved, because waste below the angle of repose on the north and east sides is included—as if the excavation had vertical sides to the full depth of the pit. The slopes of the retrieval trench will intersect the waste zone on the north and east sides of the pit—leaving any waste that happens to lie in the sloped excavation walls. The slope on the south side of the retrieval area is thought to intersect only soil (i.e., the undisturbed strip between Pits 4/6 and 10), although some geophysical mapping data suggest that some metallic waste might be encountered. Modeling of a three-dimensional distribution of the waste to account for this slope was not warranted because the vertical distribution of the shipments is not known.

The Bechtel BWXT Idaho (previous ICP contractor) plan for retrieving waste zone material from the ARP II retrieval area involved removal of the east wall of the existing Retrieval Enclosure, thereby allowing a continuation of the moving trench campaign begun during ARP I. In this moving-trench campaign, swaths of waste zone material from the east side of the open trench were to be excavated and

examined to remove targeted waste forms. Then, the remaining nontargeted waste would be relocated to the west side of the trench, thus moving the active trench from west to east as the excavation proceeds.

The newly selected ICP contractor—CH2M-WG Idaho, LLC—intends to modify this approach. First, as described in the ICP request for proposal, only the footprint of the SDA Retrieval Area #1 will be excavated rather than the 1/2-acre, rectangular ARP II retrieval area.<sup>e</sup> Second, the east wall of the existing ARP I Retrieval Enclosure will not be removed. Thus, the waste underlying this common wall will not be accessible for excavation until after removal of the ARP I and ARP II retrieval enclosures.<sup>f</sup> Table 3 identifies the approximate as-disposed volumes of waste (by type) that lies (1) within the inaccessible region between the ARP I and ARP II excavations, (2) within the ARP II portion of the SDA Retrieval Area #1 (to the nearest 15 ft × 15 ft grid), and (3) within the remaining (i.e., potentially unexcavated) portion of the ARP II retrieval area (described 1/2-acre, rectangular area).

Table 3. Summary of as-disposed volumes by described region.

Waste Category	Targeted	Waste Volumes In Inaccessible Region of SDA Retrieval Area #1 (ft <sup>3</sup> )	Waste Volumes In Accessible Region of SDA Retrieval Area #1 (ft <sup>3</sup> )	Waste Volumes In Balance of ARP II Retrieval Area (ft <sup>3</sup> )	Total Waste Volumes (ft <sup>3</sup> )
<b>RFP Series 741 sludge</b>	<b>X</b>	<b>629</b>	<b>3,792</b>	<b>99</b>	<b>4,520</b>
RFP Series 742 sludge		437	6,377	3,375	10,189
<b>RFP Series 743 sludge</b>	<b>X</b>	<b>2,358</b>	<b>24,611</b>	<b>1,000</b>	<b>27,969</b>
RFP Series 744 sludge		403	1,646	708	2,757
RFP Series 745 sludge		3	5,541	6,390	11,934
RFP miscellaneous sludge		0	15	13	28
RFP beryllium		84	370	259	712
<b>RFP roaster oxide</b>	<b>X</b>	<b>151</b>	<b>990</b>	<b>505</b>	<b>1,646</b>
<b>RFP graphite</b>	<b>X</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>10</b>
<b>RFP filters</b>	<b>X</b>	<b>515</b>	<b>4,292</b>	<b>759</b>	<b>5,566</b>
RFP line-generated waste		143	1,112	36	1,291
RFP combustible debris		3,139	23,078	11,131	37,347
RFP noncombustible debris		3,369	29,530	21,587	54,486
Non-RFP sludge		0	59	0	59
Non-RFP combustible debris		0	37	0	37
Non-RFP noncombustible debris		177	2,593	2,649	5,419
Totals		11,408	104,043	48,521	163,970
Targeted waste as a percentage of all disposed waste in the described region		32.0%	32.4%	4.9%	24.2%

Appendix B contains a set of figures showing the distribution of each waste form within the ARP II retrieval area (i.e., locations of individual shipments containing the specified waste form). These figures

e. This EDF still provides estimates for the 1/2-acre ARP II retrieval area, because it fully encompasses the remainder (i.e., eastern half) of the SDA Retrieval Area #1.

f. A follow-on retrieval effort is planned to excavate this region for retrieving the targeted waste contained therein.

are “screen shots” from the ARP II Model Application (Java program) video display and provide the reader with a general overview of the waste geographical distribution.

## 5. LARGE OR HIGHLY RADIOACTIVE OBJECTS

Due to the equipment and methods to be used during ARP II, large objects and objects having high radiation fields could pose difficulties during excavation and retrieval operations. Table 4 presents a list of such disposals including shipment weight, volume, and description.

Table 4. Summary of disposal shipments potentially<sup>a</sup> containing large, heavy, or highly radioactive objects that could pose difficulties during excavation and retrieval operations.

Disposal ID	Description/[Location]	Weight (lb)	Volume (ft <sup>3</sup> )	Radiation Level (mR/hour @ contact/ @ 1m)
<b>INL Disposals</b>				
ANL767SR008/01/67800	Contaminated equipment [Pit 4; Grids U6-7 and V6-7]	<b>4,000<sup>a</sup></b>	250	10/<1
ARA626SR009/15/67800	Contaminated metal from ARA hot cell [Pit 4; Grid AA3]	1,000	250	<b>200/1</b>
CPP601SR005/11/67800	Pipe and pump heads from “F” cell [Pit 4; Grids T7-8 and U7-8]	1,500	60	<b>1,000/200</b> (3 Ci)
NRF618SR006/23/67800	Steel tank with corrosion products [Pit 4; Grids W4-5 and X4-5]	<b>6,000</b>	250	<b>350/25</b> (500 mCi)
NRF618SR008/09/67800	Four barrels of mixed fission waste materials, one steel stand [Pit 4; Grids V7 and W7]	3,000	90	<b>250/8</b> (175 mCi)
NRF618SR008/22/67810	Eight barrels of bottom slurry from evaporator tanks, miscellaneous steel pipe pieces [Pit 4; Grids W7-8]	5,000	70	<b>350/30</b> (265 mCi)
TAN607SR007/28/67800	Mild steel plate [Pit 4; Grids V7-8 and W7-8]	<b>21,000<sup>a</sup></b>	360	0.5/kg <sub>rd</sub>
TAN633SR002/28/63810 <sup>b</sup>	22 × 11-ft-diameter cask containing mixed fission products from SL1 [Pit 4; Grids U1 and V1]	<b>76,000</b>	<b>2,486</b>	<b>1,500/A</b> (150 Ci)
NRF618SR007/19/67800	Evaporator bottoms—concentrates in absorbents [Pit 6; Grids AB1 and AC1]	NA	32	<b>800/30</b> (1.5 Ci)
<b>RFP Disposals</b>				
RFODOWSR102/15/6881010 <sup>b</sup>	28 55-gal drums containing paper, plastic, scrap metal, concrete, and wood ( <b>including two 55-gal drums marked “U233” weighing 1,100 lb each, presumably cemented, and possibly high radiation due to daughters of U-232 [an impurity]</b> ); 48 55-gal drums containing Series 74 sludge; 10 cartons containing chemical warfare system type filters; 51 boxed 55-gal drums (empties) [Pit 6, Grids AF1 and AG1]	33,802	1,247	1.2 (trailer)

Note: **Bold** indicates attribute of concern.

a. Certain heavy shipments may be composed of multiple smaller items with individual weights that would not be considered problematic.

b. Shipment is located outside the SDA Retrieval Area #1, but inside the ARP II retrieval area.



## 6. TRANSURANIC ACTIVITY ESTIMATE

Table 5 provides an estimate of the TRU activity disposed of in the ARP II retrieval area (targeted waste forms are indicated). This estimate includes the principal TRU radionuclides only (i.e., Pu-239, Pu-240, and Am-241) and uses the SMBA scenario generator for allocation of TRU activity (from the Contaminant Inventory Database for Risk Assessment) to applicable RFP waste types (i.e., using the Ci/lb basis). This estimate, therefore, is consistent with the method used to produce the OU 7-13/14 TRU density maps of the SDA. It is important to note, however, that certain waste types that are known to contain TRU contaminants were not allocated a part of the total TRU activity by the SMBA scenario generator. It is believed that the contribution of activity from these minor sources is not significant compared to the heavily contaminated RFP waste forms (i.e., Series 741 sludge, filters, and graphite). When excavated, the minor contributors (e.g., Series 742 sludge) are still likely to be contaminated at TRU-waste levels. This estimate does not adjust for the angle of repose and TRU activity that may not be retrieved (i.e., present in waste that lies under the angle of repose).

Table 5. Summary of transuranic activity (Pu-239, Pu-240, and Am-241 only), as allocated for the Operable Unit 7-13/14 transuranic density maps, by waste type for shipments (or portions thereof) within the Accelerated Retrieval Project II retrieval area.

Waste Category	Targeted	Pu-239 (Ci)	Pu-240 (Ci)	Am-241 (Ci)	Total (Ci)
<b>RFP Series 741 sludge</b>	<b>X</b>	<b>571</b>	<b>128</b>	<b>12,079</b>	<b>12,778</b>
RFP Series 742 sludge		—	—	—	—
<b>RFP Series 743 sludge</b>	<b>X</b>	<b>72</b>	<b>16</b>	—	<b>88</b>
RFP Series 744 sludge		60	14	—	74
RFP Series 745 sludge		1	—	2	3
RFP beryllium		—	—	—	—
<b>RFP roaster oxide</b>	<b>X</b>	—	—	—	—
<b>RFP graphite</b>	<b>X</b>	—	—	—	—
<b>RFP filters</b>	<b>X</b>	<b>123</b>	<b>27</b>	<b>32</b>	<b>182</b>
RFP line-generated waste		1,691	379	0	2,070
RFP combustible debris		319	71	1,836	2,226
RFP noncombustible debris		619	139	315	1,073
Non-RFP sludge		—	—	—	—
Non-RFP combustible debris		—	—	—	—
Non-RFP noncombustible debris		—	—	—	—
<b>Totals</b>		<b>3,456</b>	<b>774</b>	<b>14,264</b>	<b>18,494</b>

Table 6 identifies the breakdown of TRU activity for the regions described earlier for Table 3.

Table 6. Summary of as-disposed transuranic activity by described region.

Waste Retrieval Designation	TRU Activity in Inaccessible Region of SDA Retrieval Area #1 (Ci)	TRU Activity in Accessible Region of SDA Retrieval Area #1 (Ci)	TRU Activity in Balance of ARP II Retrieval Area (Ci)	Total TRU Activity (Ci)
<b>Targeted waste</b>	<b>1,829</b>	<b>10,902</b>	<b>317</b>	<b>13,048</b>
Nontargeted waste	583	3,734	1,129	5,447
Totals	2,412	14,636	1,446	18,494
TRU activity in the targeted waste as a percentage of total TRU activity within the described region	75.8%	74.5%	21.9%	70.6%

From the values shown in Table 6, the removal of the targeted waste forms from the entire ARP II retrieval area (containing approximately 13,048 Ci) would provide a TRU activity reduction of approximately 71% (13,048 Ci/18,494 Ci). Retrieval of the accessible SDA Retrieval Area #1 region should provide a TRU activity reduction of approximately 74.5% for the area excavated, or approximately 58.9% (10,902 Ci/18,494 Ci) for the full ARP II retrieval area.

## 7. CONCLUSIONS AND RECOMMENDATIONS

The information presented here is based on the best information available about disposals in the ARP II retrieval area. It should be noted, however, that these data are approximate, at best. As noted previously, the location information for the shipments can be as little as a single point, with no indication of the area that was actually covered when the shipment was dumped into the pit. The volume information is imprecise as well. In some cases, the volume of the shipment may have been recorded as the volume of the dumpster in which it arrived at the site rather than the actual volume of waste in the dumpster. Similarly, the volume of a large shipment may have been recorded as the "bounding box" for the waste. Review of the data also indicate that, in some cases of overlapping disposal footprints, more waste volume is attributed to an area of the pit than is physically possible.

Nonetheless, the data presented here are believed to be the best data available and should be used as the design basis for ARP II.

## 8. REFERENCES

42 USC § 9601 et seq., 1980, "Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA/Superfund)," *United States Code*.

Clements Jr., T. L., 1982, *Content Code Assessments for INEL Contact-Handled Stored Transuranic Wastes*, WM-F1-82-021, Idaho National Laboratory.

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## **Appendix A**

### **Summary of Waste Types by Disposal ID Number for the Waste Inventory Contained in the Accelerated Retrieval Project II Retrieval Area Including Angle of Repose**

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Table A-1. Summary of waste types by disposal ID number for the waste inventory contained in the Phase II of the Accelerated Retrieval Project retrieval area including the angle of repose.

Document ID Number (Sorted by ID)			Disposal Location <sup>a</sup> (upper left corner)		Disposal Footprint			Waste Volumes by Type (ft <sup>3</sup> )														Non-Rocky Flats Plant Waste <sup>d</sup>		
								Rocky Flats Plant Waste																
			X-axis (ft)	Y-axis (ft)	Width (ft)	Height (ft)	Scale Factor	Series 741 Sludge	Series 742 Sludge	Series 743 Sludge	Series 744 Sludge	Series 745 Sludge <sup>b</sup>	Line- Generated Waste	Beryllium- Contaminated Waste	Roaster Oxide (DU <sup>c</sup> )	Graphite	Filters	Combustible Debris	Non- combustible Debris	Sludge	Combustible Debris	Non- combustible Debris		
ANL767SR008/01/67800 <sup>c</sup>	4,000	250	879.08	92.30	10.0	10.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	250			
ARA626SR009/15/67800 <sup>f</sup>	1,000	250	962.85	35.40	10.0	10.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	250			
CFA601SR009/15/66110 <sup>g</sup>	30	1	854.92	111.38	10.0	10.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	1			
CFA690SR008/22/67800	3,000	630	892.43	111.96	20.0	5.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	630			
CPP601SR005/11/67800 <sup>h</sup>	1,500	60	865.00	102.19	10.0	10.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	60			
NRF601SR006/22/67800 <sup>i</sup>	12,000	150	895.66	22.44	10.0	10.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	150			
NRF617SR005/02/67800	300	44	855.00	102.10	10.0	10.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	44			
NRF618SR005/05/67820	0	243	855.70	17.10	10.0	10.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	243			
NRF618SR006/23/67800	6,000	250	900.38	57.57	19.0	9.9	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	250			
NRF618SR007/19/67800	0	32	985.93	-0.26	5.0	20.0	1.0	0	0	0	0	0	0	0	0	0	0	0	32	0	0			
NRF618SR007/19/67810	0	50	985.93	-0.26	5.0	20.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	50	0			
NRF618SR007/25/67800	0	135	884.95	108.63	10.0	10.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	135			
NRF618SR008/09/67800	3,000	90	895.04	97.43	10.0	10.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	90			
NRF618SR008/22/67810	5,000	70	900.01	102.48	10.0	10.0	1.0	0	0	0	0	0	0	0	0	0	0	0	35	0	35			
RFODOWSR101/11/6880010 <sup>j</sup>	31,121	558	952.30	79.09	20.0	19.7	1.0	0	132	0	51	316	0	0	0	0	30	30	0	0	0			
RFODOWSR101/11/6881000	30,704	558	952.42	69.08	20.0	19.8	1.0	0	147	0	37	272	0	0	0	0	73	29	0	0	0			
RFODOWSR101/15/6880000	30,035	1,109	1020.98	42.22	19.9	20.0	1.0	0	0	0	0	0	0	0	0	0	555	555	0	0	0			
RFODOWSR101/15/6881000	34,880	559	1020.94	32.25	20.0	19.9	1.0	0	162	7	22	368	0	0	0	0	0	0	0	0	0			
RFODOWSR101/18/6880000	41,365	1,117	962.56	59.02	20.0	20.1	1.0	0	154	0	44	243	0	0	0	0	508	169	0	0	0			
RFODOWSR101/18/6881020	33,298	560	1020.94	12.22	20.0	20.0	1.0	0	140	0	15	375	0	0	0	0	30	0	0	0	0			
RFODOWSR101/22/6880000	33,156	1,117	962.52	64.02	20.0	15.1	1.0	0	103	0	7	272	0	0	0	0	610	125	0	0	0			
RFODOWSR101/22/6881010	35,348	1,118	962.15	89.03	20.0	29.1	1.0	0	169	0	7	213	0	15	0	0	612	102	0	0	0			
RFODOWSR101/25/6880020	34,828	1,117	1020.94	12.22	20.0	20.0	1.0	0	125	0	7	301	0	0	0	0	515	169	0	0	0			
RFODOWSR101/25/6881010	33,829	1,115	1020.98	42.22	19.9	20.0	1.0	0	118	0	29	301	0	0	0	0	601	66	0	0	0			
RFODOWSR101/29/6880000	35,121	1,117	1030.93	47.13	20.0	20.2	1.0	0	88	0	66	272	0	0	0	0	530	162	0	0	0			
RFODOWSR101/29/6881030	31,022	1,117	1030.87	22.20	20.1	20.0	1.0	0	0	0	0	0	0	7	103	0	573	434	0	0	0			
RFODOWSR102/02/6880000	34,934	1,118	1030.86	42.20	20.2	20.0	1.0	0	125	0	22	294	0	0	0	0	566	111	0	0	0			
RFODOWSR102/02/6881000	34,645	1,116	972.09	99.28	20.0	18.8	1.0	0	118	0	7	301	0	0	0	0	297	393	0	0	0			
RFODOWSR102/08/6880000	34,218	1,222	1030.94	22.13	25.0	30.2	1.0	0	169	0	7	316	0	0	0	0	22	708	0	0	0			
RFODOWSR102/08/6881000	28,009	559	1030.94	42.13	25.0	30.2	1.0	0	110	0	15	412	0	0	0	0	22	0	0	0	0			
RFODOWSR102/12/6880000	32,300	1,171	1062.45	70.22	20.0	15.0	1.0	0	0	0	0	0	0	0	0	0	586	586	0	0	0			
RFODOWSR102/12/6881020	27,600	2,121	1062.45	70.22	20.0	15.0	1.0	0	0	0	0	0	0	0	0	0	1,061	1,061	0	0	0			
RFODOWSR102/15/6880010	31,629	559	1055.94	32.17	10.0	20.1	1.0	0	147	0	22	390	0	0	0	0	0	0	0	0	0			

Table A-1. (continued).

Document ID Number (Sorted by ID)			Weight (lb)			Volume (ft³)			Disposal Location <sup>a</sup> (upper left corner)		Disposal Footprint		Waste Volumes by Type (ft³)													Non-Rocky Flats Plant Waste <sup>d</sup>		
													Rocky Flats Plant Waste															
									X-axis (ft)	Y-axis (ft)	Width (ft)	Height (ft)	Scale Factor	Series 741 Sludge	Series 742 Sludge	Series 743 Sludge	Series 744 Sludge	Series 745 Sludge <sup>b</sup>	Line- Generated Waste	Beryllium- Contaminated Waste	Roaster Oxide (DU <sup>c</sup> )	Graphite	Filters	Combustible Debris	Non- combustible Debris	Sludge	Combustible Debris	Non- combustible Debris
RFODOWSR102/15/6881010	33,800	1,248	1040.93	3.25	15.0	18.9	1.0	0	110	0	15	213	0	0	0	0	61	116	733	0	0	0						
RFODOWSR102/19/6880020	31,339	1,118	1065.93	3.28	15.0	18.9	1.0	0	0	0	0	0	0	110	110	15	0	276	606	0	0	0						
RFODOWSR102/19/6881000	32,728	1,121	1055.92	3.19	15.0	19.0	1.0	0	0	0	0	0	0	88	4	0	0	500	530	0	0	0						
RFODOWSR102/22/6880000	34,893	1,116	1040.94	22.25	15.0	14.9	1.0	0	140	0	7	272	0	0	0	0	0	305	393	0	0	0						
RFODOWSR102/22/6881010	38,893	1,117	1055.92	22.18	15.0	15.1	1.0	0	162	0	0	279	0	0	0	0	0	268	408	0	0	0						
RFODOWSR102/26/6882010	32,097	1,222	1050.94	32.11	10.0	20.2	1.0	0	132	0	29	272	0	0	0	0	0	85	705	0	0	0						
RFODOWSR102/26/6883000	37,545	1,117	1030.93	52.14	20.0	25.2	1.0	0	88	0	74	279	0	0	0	0	0	309	367	0	0	0						
RFODOWSR102/29/6880000	36,695	1,117	982.43	69.18	15.0	20.2	1.0	0	125	0	29	279	15	0	0	0	0	441	228	0	0	0						
RFODOWSR102/29/6881000	36,587	1,120	982.48	59.28	15.2	15.0	1.0	0	191	0	29	206	0	0	0	0	0	288	406	0	0	0						
RFODOWSR103/07/6880000	35,927	1,223	977.62	54.38	45.0	15.0	1.0	0	162	0	0	228	0	0	0	0	0	85	749	0	0	0						
RFODOWSR103/07/6881000	37,031	1,110	1007.49	64.55	15.0	15.0	1.0	0	125	0	15	286	0	0	0	0	0	287	397	0	0	0						
RFODOWSR103/14/6880000	35,850	1,115	1012.12	94.65	20.0	20.0	1.0	0	132	0	0	250	7	0	0	0	0	451	275	0	0	0						
RFODOWSR103/14/6881000	31,252	1,222	1017.27	84.65	25.0	15.2	1.0	0	118	0	22	279	0	0	0	0	0	73	730	0	0	0						
RFODOWSR103/17/6783010	22,700	2,074	800.23	71.68	40.0	15.2	1.0	0	0	0	0	0	0	0	0	0	976	0	1,098	0	0	0						
RFODOWSR103/21/6880000	30,927	1,223	1052.46	70.01	20.0	10.2	1.0	0	162	0	22	294	0	0	0	0	0	30	716	0	0	0						
RFODOWSR103/21/6881000	32,285	1,222	1070.95	42.08	20.0	15.3	1.0	0	132	0	44	279	0	0	0	0	0	30	738	0	0	0						
RFODOWSR103/25/6880000	29,119	1,222	1032.37	79.82	20.0	10.1	1.0	0	51	0	118	206	0	0	0	0	0	103	745	0	0	0						
RFODOWSR103/25/6881010	31,717	1,230	1022.16	89.87	20.0	24.8	1.0	0	132	0	110	213	0	0	0	0	0	51	723	0	0	0						
RFODOWSR103/31/6780060	37,032	1,108	800.39	51.77	30.0	14.9	1.0	118	29	206	29	0	66	0	0	0	0	51	609	0	0	0						
RFODOWSR103/31/6781020	40,868	996	810.59	26.70	30.0	20.2	1.0	7	37	331	37	0	0	0	0	0	437	37	110	0	0	0						
RFODOWSR103/31/6782010	36,277	1,197	800.47	41.77	30.0	14.9	1.0	81	37	265	29	0	0	0	0	0	0	139	646	0	0	0						
RFODOWSR103/31/6783010	35,652	552	800.60	26.76	30.0	14.9	1.0	7	81	272	37	0	0	0	0	0	0	30	125	0	0	0						
RFODOWSR104/01/6880000	33,261	1,117	1070.95	42.08	20.0	15.3	1.0	0	0	0	0	0	0	88	118	0	0	408	503	0	0	0						
RFODOWSR104/07/6780020	34,758	1,102	820.49	41.91	30.0	10.0	1.0	132	37	88	44	0	81	0	0	0	0	309	412	0	0	0						
RFODOWSR104/07/6781060	34,201	1,110	820.39	51.92	30.0	15.0	1.0	0	0	0	0	0	0	88	140	0	0	632	250	0	0	0						
RFODOWSR104/07/6782010	34,369	558	820.60	26.91	30.0	15.0	1.0	162	88	59	162	0	0	0	0	0	0	87	0	0	0	0						
RFODOWSR104/07/6783010	25,600	2,074	840.16	82.07	30.0	10.0	1.0	0	0	0	0	0	0	0	0	0	732	671	671	0	0	0						
RFODOWSR104/08/6880010	28,919	1,223	1052.32	80.02	20.0	15.2	1.0	0	184	0	0	235	0	0	0	0	0	30	775	0	0	0						
RFODOWSR104/08/6881020	34,831	1,117	1047.42	69.99	15.1	15.1	1.0	0	0	0	0	0	0	59	88	0	0	335	636	0	0	0						
RFODOWSR104/11/6880010	24,239	1,223	1057.43	70.23	15.0	14.8	1.0	0	103	0	22	140	0	0	0	0	0	151	808	0	0	0						
RFODOWSR104/11/6881010	26,947	1,222	1052.60	54.96	15.0	20.3	1.0	0	0	0	0	0	0	0	0	0	0	279	943	0	0	0						
RFODOWSR104/14/6780020	22,140	1,145	835.29	56.98	20.1	20.0	1.0	0	0	0	0	0	37	0	22	0	0	125	961	0	0	0						
RFODOWSR104/14/67810120	29,558	1,103	830.65	21.94	20.0	15.0	1.0	0	0	243	0	0	7	0	0	0	0	379	474	0	0	0						
RFODOWSR104/14/6782070	37,084	1,118	830.50	36.95	20.0	20.0	1.0	37	0	272	59	0	0	0	0	0	0	632	118	0	0	0						

Table A-1. (continued).

Document ID Number (Sorted by ID)Weight (lb)Volume (ft³)			Disposal Location <sup>a</sup> (upper left corner)		Disposal Footprint			Waste Volumes by Type (ft³)													Non-Rocky Flats Plant Waste <sup>d</sup>		
								Rocky Flats Plant Waste															
			X-axis (ft)	Y-axis (ft)	Width (ft)	Height (ft)	Scale Factor	Series 741 Sludge	Series 742 Sludge	Series 743 Sludge	Series 744 Sludge	Series 745 Sludge <sup>b</sup>	Line- Generated Waste	Beryllium- Contaminated Waste	Roaster Oxide (DU <sup>c</sup> )	Graphite	Filters	Combustible Debris	Non- combustible Debris	Sludge	Combustible Debris	Non- combustible Debris	
RFODOWSR104/14/6783000	37,955	558	830.40	51.95	20.0	15.0	1.0	7	0	492	0	0	0	0	0	0	0	59	0	0	0		
RFODOWSR104/17/6880000	29,225	1,223	1077.59	55.40	20.0	20.0	1.0	0	132	7	59	125	0	0	0	0	0	159	742	0	0	0	
RFODOWSR104/21/6780070	35,501	1,117	835.64	22.11	25.0	14.8	1.0	66	51	206	22	0	15	0	0	0	0	698	59	0	0	0	
RFODOWSR104/21/6781080	31,729	1,095	835.56	32.12	25.0	14.8	1.0	110	74	147	22	0	0	0	0	0	0	415	328	0	0	0	
RFODOWSR104/21/6782010	34,947	551	835.46	47.12	25.0	9.8	1.0	74	88	257	51	0	0	0	0	0	0	59	22	0	0	0	
RFODOWSR104/21/6783000	36,322	558	835.33	57.12	25.0	19.8	1.0	0	88	323	29	0	0	0	0	0	0	0	118	0	0	0	
RFODOWSR104/28/67800461	35,962	1,110	845.56	32.21	35.0	14.8	1.0	147	140	66	0	0	0	0	0	0	0	426	331	0	0	0	
RFODOWSR104/28/6781010	36,376	1,110	840.32	57.20	40.0	19.8	1.0	132	22	198	0	0	0	0	0	0	0	357	401	0	0	0	
RFODOWSR104/28/6782090	35,857	558	850.60	22.08	20.0	25.1	1.0	7	66	309	44	44	0	0	0	0	0	81	7	0	0	0	
RFODOWSR104/28/6783020	35,410	556	840.47	42.20	40.0	14.8	1.0	44	66	316	44	0	0	0	0	0	0	43	43	0	0	0	
RFODOWSR105/05/6780050	37,940	1,117	855.51	37.16	35.0	15.1	1.0	0	0	0	0	0	0	22	323	0	0	294	478	0	0	0	
RFODOWSR105/05/6781020	37,251	1,110	855.43	47.17	35.0	15.1	1.0	51	44	235	22	0	7	0	0	0	0	559	191	0	0	0	
RFODOWSR105/05/6782020	22,171	1,132	855.59	27.21	30.0	15.0	1.0	0	0	0	0	0	0	0	0	0	0	280	853	0	0	0	
RFODOWSR105/05/6783020	30,743	1,073	855.32	57.22	30.0	19.9	1.0	0	0	0	0	0	0	0	0	0	0	22	1,051	0	0	0	
RFODOWSR105/12/6780000	26,842	1,517	860.70	17.17	30.0	15.1	1.0	0	0	0	0	0	0	0	0	0	959	228	330	0	0	0	
RFODOWSR105/12/6781000	35,911	558	860.47	47.27	20.0	9.8	1.0	88	66	228	88	0	0	0	0	0	0	66	22	0	0	0	
RFODOWSR105/12/6782000	35,477	557	860.40	47.29	20.0	19.8	1.0	59	51	316	29	0	0	0	0	0	0	66	36	0	0	0	
RFODOWSR105/12/6783000	32,408	1,118	860.29	62.29	20.0	14.8	1.0	59	29	243	22	0	0	0	0	0	0	206	559	0	0	0	
RFODOWSR105/18/6780010	39,931	1,743	875.40	47.31	35.0	20.1	1.0	44	66	221	22	0	0	0	0	0	1,184	191	15	0	0	0	
RFODOWSR105/18/6781010	32,881	1,255	875.48	42.30	35.0	10.1	1.0	44	29	272	7	0	0	0	0	0	0	169	734	0	0	0	
RFODOWSR105/19/6780010	41,017	1,677	875.48	42.30	35.0	10.1	1.0	37	37	257	7	0	0	0	0	0	1,119	213	7	0	0	0	
RFODOWSR105/26/6780060	38,834	1,118	885.56	32.50	34.0	14.9	1.0	74	15	250	15	0	0	0	0	0	0	639	125	0	0	0	
RFODOWSR105/26/6781030	39,570	559	885.50	37.50	34.0	19.9	1.0	66	44	323	37	0	0	0	0	0	0	74	15	0	0	0	
RFODOWSR105/26/6782010	35,479	1,151	885.68	17.33	25.0	15.2	1.0	37	15	257	44	0	0	0	0	0	232	161	404	0	0	0	
RFODOWSR106/02/6780000	37,519	558	890.37	57.40	10.0	10.0	1.0	37	29	382	22	0	0	0	0	0	0	59	29	0	0	0	
RFODOWSR106/02/6781015	36,314	559	890.45	47.40	10.0	10.0	1.0	37	51	353	29	0	0	0	0	0	0	33	55	0	0	0	
RFODOWSR106/09/6780000	39,468	558	895.38	52.46	10.0	15.0	1.0	29	66	353	22	0	0	0	0	0	0	32	55	0	0	0	
RFODOWSR106/09/6781030	38,358	1,118	895.25	71.63	15.0	6.7	1.0	37	37	265	15	0	81	0	0	0	0	485	198	0	0	0	
RFODOWSR106/09/6782010	39,918	1,110	910.38	50.07	5.0	19.9	1.0	0	0	0	0	0	0	51	191	0	0	213	654	0	0	0	
RFODOWSR106/09/6783010	39,191	551	910.24	67.57	5.0	19.9	1.0	51	7	397	15	0	0	0	0	0	0	81	0	0	0	0	
RFODOWSR106/15/6780020	35,979	551	890.41	37.53	29.0	39.9	1.0	44	103	272	22	7	0	0	0	0	0	59	44	0	0	0	
RFODOWSR106/15/6781000	38,245	552	890.41	37.53	29.0	39.9	1.0	59	37	331	44	0	0	0	0	0	0	22	59	0	0	0	
RFODOWSR106/16/6780010	34,774	552	890.55	27.52	29.0	24.9	1.0	51	37	309	0	0	0	0	0	0	0	30	125	0	0	0	
RFODOWSR106/16/6781010	38,317	1,116	880.20	77.42	20.0	14.9	1.0	7	66	184	37	0	103	0	0	0	0	441	279	0	0	0	



Table A-1. (continued).

Document ID Number (Sorted by ID)Weight (lb)Volume (ft³)			Disposal Location <sup>a</sup> (upper left corner)		Disposal Footprint			Waste Volumes by Type (ft³)													Non-Rocky Flats Plant Waste <sup>d</sup>		
								Rocky Flats Plant Waste															
			X-axis (ft)	Y-axis (ft)	Width (ft)	Height (ft)	Scale Factor	Series 741 Sludge	Series 742 Sludge	Series 743 Sludge	Series 744 Sludge	Series 745 Sludge <sup>b</sup>	Line- Generated Waste	Beryllium- Contaminated Waste	Roaster Oxide (DU <sup>c</sup> )	Graphite	Filters	Combustible Debris	Non- combustible Debris	Sludge	Combustible Debris	Non- combustible Debris	
RFODOWSR106/22/67800120	35,530	551	990.93	3.17	10.0	19.1	1.0	29	59	316	37	0	15	0	0	0	0	40	55	0	0	0	
RFODOWSR106/22/6781020	34,473	558	927.85	25.39	20.0	20.0	1.0	37	147	206	66	0	0	0	0	0	0	44	58	0	0	0	
RFODOWSR106/23/6780010	36,984	1,118	917.85	35.53	20.0	19.8	1.0	44	59	191	0	0	184	0	0	0	0	397	243	0	0	0	
RFODOWSR106/23/6781010	37,592	1,109	912.85	50.43	15.0	20.0	1.0	22	110	154	7	0	81	0	0	0	0	330	404	0	0	0	
RFODOWSR106/28/6780010	36,082	558	860.09	87.25	25.0	14.9	1.0	66	22	331	22	0	0	0	0	0	0	22	95	0	0	0	
RFODOWSR106/28/6781020	36,548	558	870.21	72.19	25.0	20.2	1.0	29	66	323	44	0	15	0	0	0	0	41	41	0	0	0	
RFODOWSR106/29/6780010	35,612	558	927.84	15.51	30.0	14.8	1.0	51	110	279	29	0	0	0	0	0	0	47	40	0	0	0	
RFODOWSR106/29/6781010	36,654	559	927.83	5.51	30.0	14.8	1.0	51	66	331	22	0	0	0	0	0	0	44	44	0	0	0	
RFODOWSR106/30/6780020	36,814	558	917.86	35.39	30.0	15.0	1.0	29	74	338	29	0	44	0	0	0	0	22	22	0	0	0	
RFODOWSR106/30/6781010	37,553	1,117	917.87	50.38	30.0	20.1	1.0	22	81	235	15	0	51	0	0	0	0	0	713	0	0	0	
RFODOWSR107/06/6780030	35,337	558	927.83	35.39	20.0	20.0	1.0	51	103	316	37	0	0	0	0	0	0	22	29	0	0	0	
RFODOWSR107/06/6781010	36,744	559	937.96	15.39	19.8	20.0	1.0	29	66	360	0	0	0	0	0	0	0	52	52	0	0	0	
RFODOWSR107/11/6780010	36,257	551	932.90	30.40	19.9	20.0	1.0	51	88	323	7	0	7	0	0	0	0	67	7	0	0	0	
RFODOWSR107/11/6781010	36,950	559	932.90	30.40	19.9	20.0	1.0	74	59	323	11	0	0	0	0	0	0	55	37	0	0	0	
RFODOWSR107/13/6780030	30,999	1,116	890.24	67.53	29.0	19.9	1.0	0	0	0	0	0	0	125	81	0	0	367	543	0	0	0	
RFODOWSR107/13/6781010	36,369	551	937.84	5.45	15.0	9.9	1.0	22	29	360	15	44	15	0	0	0	0	44	22	0	0	0	
RFODOWSR107/19/6780090	35,219	557	937.82	5.41	10.0	10.0	1.0	51	51	279	29	59	0	0	0	0	0	88	0	0	0	0	
RFODOWSR107/19/6781010	35,358	558	937.84	40.51	20.0	9.8	1.0	29	132	294	7	15	0	0	0	0	0	81	0	0	0	0	
RFODOWSR107/21/6780010	37,134	1,118	942.85	20.50	15.0	19.8	1.0	22	81	228	22	0	0	0	0	0	0	743	22	0	0	0	
RFODOWSR107/21/6781010	34,500	1,044	885.40	52.35	25.0	15.1	1.0	44	44	265	0	0	51	0	0	0	0	243	397	0	0	0	
RFODOWSR107/25/6780080	36,130	559	952.84	30.30	10.0	20.2	1.0	74	66	331	0	0	0	0	0	0	0	88	0	0	0	0	
RFODOWSR107/25/6781010	36,531	558	952.84	30.30	10.0	20.2	1.0	22	103	331	15	0	0	0	0	0	0	55	33	0	0	0	
RFODOWSR107/26/6780020	36,408	558	890.20	77.38	20.0	10.1	1.0	37	103	323	7	0	7	0	0	0	0	22	59	0	0	0	
RFODOWSR107/26/6781080	36,475	1,117	882.58	62.43	35.4	20.0	3.5	0	74	272	7	0	0	0	0	0	0	720	44	0	0	0	
RFODOWSR108/02/6780020	35,182	559	937.85	10.50	20.0	9.8	1.0	15	15	441	0	0	0	0	0	0	0	40	48	0	0	0	
RFODOWSR108/02/6781010	35,133	558	937.83	15.52	20.0	14.8	1.0	29	37	404	0	0	22	0	0	0	0	33	33	0	0	0	
RFODOWSR108/04/67800110	37,750	558	937.84	40.51	20.0	14.8	1.0	51	96	316	0	0	44	0	0	0	0	22	29	0	0	0	
RFODOWSR108/04/6781010	38,679	1,116	952.83	5.31	10.0	15.2	1.0	44	81	198	0	0	51	0	0	0	0	507	235	0	0	0	
RFODOWSR108/09/6780010	36,261	558	880.17	82.43	20.0	9.9	1.0	59	66	345	0	0	0	0	0	0	0	66	22	0	0	0	
RFODOWSR108/09/6781010	36,406	559	870.12	87.25	20.0	10.1	1.0	59	74	338	0	0	0	0	0	0	0	73	15	0	0	0	
RFODOWSR108/11/6780030	39,841	1,119	957.82	10.39	10.0	15.0	1.0	37	44	243	0	0	81	0	0	0	0	354	361	0	0	0	
RFODOWSR108/11/6781010	38,063	558	952.84	30.30	10.0	15.2	1.0	29	118	323	0	0	0	0	0	0	0	29	59	0	0	0	
RFODOWSR108/16/6780010	35,895	551	889.98	102.48	10.0	13.8	1.0	51	74	331	0	0	15	0	0	0	0	40	40	0	0	0	
RFODOWSR108/17/6780050	36,655	551	885.07	92.38	15.0	15.0	1.0	59	110	301	0	0	0	0	0	0	0	41	41	0	0	0	

Table A-1. (continued).

Document ID Number (Sorted by ID)			Weight (lb)			Volume (ft³)			Disposal Location <sup>a</sup> (upper left corner)		Disposal Footprint		Waste Volumes by Type (ft³)												Non-Rocky Flats Plant Waste <sup>d</sup>		
													Rocky Flats Plant Waste														
													Series 741 Sludge	Series 742 Sludge	Series 743 Sludge	Series 744 Sludge	Series 745 Sludge <sup>b</sup>	Line- Generated Waste	Beryllium- Contaminated Waste	Roaster Oxide (DU <sup>c</sup> )	Graphite	Filters	Combustible Debris	Non- combustible Debris	Sludge	Combustible Debris	Non- combustible Debris
RFODOWSR108/18/6780010	36,807	551	900.07	97.52	18.9	19.0	1.0	74	66	331	0	0	0	0	0	0	0	51	29	0	0	0					
RFODOWSR108/19/6683010	15,800	1,623	812.13	88.82	15.9	15.9	1.0	0	0	0	0	0	0	0	0	0	0	0	1,623	0	0	0					
RFODOWSR108/22/6780010	35,802	558	957.83	15.48	19.0	9.8	1.0	37	132	294	7	0	29	0	0	0	0	59	0	0	0	0					
RFODOWSR108/22/6781010	37,829	558	880.00	102.34	30.0	14.1	1.0	22	96	345	7	0	0	0	0	0	0	66	22	0	0	0					
RFODOWSR108/23/6780020	35,809	1,117	947.85	35.30	15.0	10.2	1.0	0	0	0	0	0	66	96	125	0	0	335	496	0	0	0					
RFODOWSR108/23/6781010	29,790	1,117	880.09	87.49	39.0	19.9	1.0	0	0	0	0	0	0	0	0	0	0	559	559	0	0	0					
RFODOWSR108/29/6780080	37,279	558	910.08	92.01	9.0	11.1	1.0	51	37	360	22	0	0	0	0	0	0	81	7	0	0	0					
RFODOWSR108/29/6781040	32,680	559	962.84	5.39	10.0	10.0	1.0	59	37	345	29	0	0	0	0	0	0	74	15	0	0	0					
RFODOWSR108/30/6780000	37,949	1,109	957.83	15.49	19.0	29.8	1.0	29	44	198	7	15	118	0	0	0	0	349	349	0	0	0					
RFODOWSR108/30/6781070	37,952	557	957.83	25.47	19.0	9.8	1.0	44	88	279	0	59	0	0	0	0	0	65	22	0	0	0					
RFODOWSR109/06/6780010	38,185	550	957.83	20.48	19.0	19.8	1.0	51	29	331	7	44	0	0	0	0	0	51	37	0	0	0					
RFODOWSR109/06/6781040	34,604	1,178	905.13	67.58	14.0	48.9	1.0	37	7	154	0	96	0	0	0	0	0	261	623	0	0	0					
RFODOWSR109/12/6682010	15,400	1,347	832.91	79.69	14.5	14.5	1.0	0	0	0	0	0	0	0	0	0	0	0	1,347	0	0	0					
RFODOWSR109/12/6683010	27,650	1,127	853.53	80.47	13.3	13.3	1.0	0	0	0	0	0	0	0	0	0	564	0	564	0	0	0					
RFODOWSR109/13/6780010	33,015	552	910.14	82.62	9.0	14.9	1.0	29	74	206	0	162	0	0	0	0	0	59	22	0	0	0					
RFODOWSR109/13/6781010	35,885	1,223	967.85	20.47	9.0	29.9	1.0	44	7	213	0	118	0	0	0	0	0	88	753	0	0	0					
RFODOWSR109/16/6682000	21,500	1,308	833.02	79.79	14.3	14.3	1.0	0	0	0	0	0	0	0	0	0	0	0	1,308	0	0	0					
RFODOWSR109/16/6683020	11,200	848	864.41	81.44	11.5	11.5	1.0	0	0	0	0	0	0	0	0	0	0	0	848	0	0	0					
RFODOWSR109/20/6780050	37,036	1,216	900.57	32.56	19.0	14.9	1.0	22	44	213	0	103	0	0	0	0	0	117	717	0	0	0					
RFODOWSR109/20/6781020	31,268	1,111	883.71	65.51	52.1	19.0	3.5	0	0	0	0	0	0	22	96	0	0	611	382	0	0	0					
RFODOWSR109/20/6782010	34,358	1,160	957.84	40.48	19.0	19.8	1.0	22	0	162	0	184	0	0	0	0	0	221	571	0	0	0					
RFODOWSR109/20/6783010	34,152	1,160	957.83	5.48	19.0	19.8	1.0	22	22	206	0	132	0	0	0	0	0	88	690	0	0	0					
RFODOWSR109/22/6780010	34,763	1,214	981.95	17.31	19.0	19.8	1.0	29	22	256	0	74	0	0	0	0	0	122	712	0	0	0					
RFODOWSR109/22/6781010	33,025	1,121	981.95	47.31	19.0	14.8	1.0	0	0	0	0	0	0	0	0	0	0	448	673	0	0	0					
RFODOWSR109/27/6780000	35,550	1,215	937.50	85.63	34.5	14.9	1.0	29	59	235	29	0	0	0	0	0	0	103	761	0	0	0					
RFODOWSR109/27/6781000	34,453	1,215	929.84	97.62	29.6	19.9	1.0	59	37	169	88	0	0	0	0	0	0	92	771	0	0	0					
RFODOWSR109/28/6780000	39,809	1,118	981.94	32.30	19.0	19.9	1.0	37	29	228	59	0	0	0	0	0	0	335	430	0	0	0					
RFODOWSR109/28/6781000	38,524	1,223	981.94	22.28	19.0	49.9	1.0	0	0	0	0	0	0	0	0	0	0	280	944	0	0	0					
RFODOWSR110/04/6780010	36,350	1,118	981.94	3.23	19.0	19.0	1.0	59	37	191	0	96	0	0	0	0	0	603	132	0	0	0					
RFODOWSR110/04/6781020	36,714	1,250	981.94	3.23	19.0	19.0	1.0	29	37	184	0	103	0	0	0	0	0	103	795	0	0	0					
RFODOWSR110/04/67820170	33,557	1,215	990.89	12.22	20.1	20.0	1.0	37	59	162	96	0	0	0	0	0	0	103	759	0	0	0					
RFODOWSR110/05/6780010	35,677	1,118	940.31	73.82	24.5	25.1	1.0	15	74	132	22	140	0	0	0	0	0	613	122	0	0	0					
RFODOWSR110/12/6780010	35,217	1,110	990.93	32.18	20.0	20.1	1.0	0	29	206	0	118	0	0	0	0	0	632	125	0	0	0					
RFODOWSR110/12/6781040	33,938	1,215	990.89	12.22	20.1	20.0	1.0	22	66	169	0	125	0	0	0	0	0	74	760	0	0	0					

			Disposal Location <sup>a</sup> (upper left corner)		Disposal Footprint			Waste Volumes by Type (ft <sup>3</sup> )												Non-Rocky Flats Plant Waste <sup>d</sup>			
								Rocky Flats Plant Waste															
			Document ID Number (Sorted by ID)	Weight (lb)	Volume (ft <sup>3</sup> )	X-axis (ft)	Y-axis (ft)	Width (ft)	Height (ft)	Scale Factor	Series 741 Sludge	Series 742 Sludge	Series 743 Sludge	Series 744 Sludge	Series 745 Sludge <sup>b</sup>	Line- Generated Waste	Beryllium- Contaminated Waste	Roaster Oxide (DU <sup>c</sup> )	Graphite	Filters	Combustible Debris	Non- combustible Debris	Sludge
RFODOWSR110/18/6780000	38,581	1,110	968.34	26.51	19.8	50.4	1.0	37	59	235	0	22	0	0	0	0	0	0	364	393	0	0	0
RFODOWSR110/18/6781020	40,710	1,103	963.82	45.36	19.8	30.6	1.0	15	110	221	7	0	0	0	0	0	0	0	372	379	0	0	0
RFODOWSR110/26/6780010	37,788	558	952.32	72.84	20.2	20.2	1.0	22	44	360	0	44	0	0	0	0	0	0	70	19	0	0	0
RFODOWSR110/26/6781000	40,697	1,117	943.41	90.79	19.9	20.0	1.0	22	15	272	0	44	0	0	0	0	0	0	346	419	0	0	0
RFODOWSR111/02/6780010	32,290	552	1000.94	12.28	20.0	19.9	1.0	74	15	176	0	206	0	0	0	0	0	0	29	52	0	0	0
RFODOWSR111/02/6781020	34,740	551	1000.99	32.22	19.9	20.0	1.0	44	44	235	15	132	0	0	0	0	0	0	41	41	0	0	0
RFODOWSR111/03/6780000	37,453	558	1010.93	22.16	20.0	20.1	1.0	0	51	265	0	154	0	0	0	0	0	0	44	44	0	0	0
RFODOWSR111/06/6780080	34,332	551	990.89	22.21	20.1	20.0	1.0	66	169	162	44	29	0	0	0	0	0	0	37	44	0	0	0
RFODOWSR111/08/6780020	34,284	559	1000.94	22.27	20.0	19.9	1.0	59	88	213	0	118	0	0	0	0	0	0	37	44	0	0	0
RFODOWSR111/08/6781010	36,833	558	1000.99	52.23	19.9	20.0	1.0	15	29	316	0	140	0	0	0	0	0	0	44	15	0	0	0
RFODOWSR111/10/6780020	34,588	558	1005.93	22.35	25.0	19.8	1.0	22	29	272	0	147	0	0	0	0	0	0	44	44	0	0	0
RFODOWSR111/10/6781010	33,061	559	1005.93	62.33	25.0	19.8	1.0	37	59	191	0	184	0	0	0	0	0	0	22	66	0	0	0
RFODOWSR111/15/6780000	27,492	1,116	947.17	83.87	25.1	25.1	1.0	0	0	0	0	0	7	0	0	0	0	0	540	569	0	0	0
RFODOWSR111/15/67810703	38,138	557	1005.92	3.11	25.0	24.2	1.0	22	29	301	0	147	0	0	0	0	0	0	29	29	0	0	0
RFODOWSR111/16/6780010	37,354	559	1005.92	12.35	25.0	19.7	1.0	22	37	287	7	118	0	0	0	0	0	0	44	44	0	0	0
RFODOWSR111/16/6781010	38,513	1,118	1005.93	42.33	25.0	19.8	1.0	15	22	184	7	125	15	0	0	0	0	0	375	375	0	0	0
RFODOWSR111/30/6780020	31,043	1,117	1010.93	27.16	20.0	25.1	1.0	0	0	0	0	0	0	51	132	0	0	0	339	596	0	0	0
RFODOWSR111/30/6781000	33,370	1,117	1010.93	47.15	20.0	25.1	1.0	0	0	0	0	0	0	0	0	0	0	0	544	573	0	0	0
RFODOWSR112/04/6780000	25,419	1,116	1010.93	22.16	20.0	30.1	1.0	0	0	0	0	0	0	0	0	0	0	0	548	569	0	0	0
RFODOWSR112/04/6781000	38,027	1,121	1010.93	52.16	20.0	30.1	1.0	0	0	0	0	0	0	0	4	0	0	0	559	559	0	0	0
RFODOWSR112/08/6780020	23,679	1,117	962.19	89.04	15.1	15.0	1.0	0	0	0	0	0	7	0	59	0	0	0	474	578	0	0	0
RFODOWSR112/08/6781030	28,846	1,116	962.09	99.04	15.1	15.0	1.0	0	0	0	0	0	0	0	176	0	0	0	294	646	0	0	0
TAN607SR004/17/64210 <sup>k</sup>	5,000	1,600	844.19	7.68	15.8	15.8	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,600
TAN607SR007/28/67800	21,000	360	890.01	102.39	10.0	10.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	360
TAN633SR002/28/63810	76,000	2,486	866.84	-3.39	22.0	17.7	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,486
Totals <sup>l</sup>	6,207,698	174,477						4,692	10,561	28,720	2,942	12,329	1,344	822	1,772	15	6,264	38,723	59,625	67	50	6,584	

Notes:

- a. Disposal locations are relative to a coordinate system whose origin is located at the northwest monument of Pit 4 with the X-axis parallel to the north boundary of Pit 4.
- b. Series 745 sludge entries include 28 ft<sup>3</sup> of miscellaneous RFP sludge.
- c. DU = depleted uranium
- d. Non-RFP waste sources include various INL generators.
- e. ANL = Argonne National Laboratory
- f. ARA = Auxiliary Reactor Area
- g. CFA = Central Facilities Area
- h. CPP = Chemical Processing Plant
- i. NRF = Naval Reactor Facility
- j. RFODOW = RFP Operation - Dow Chemical Company
- k. TAN = Test Area North
- l. These totals are higher than those reflected in Tables 2 and 3 of EDF-4478. This table has not been adjusted to ignore the portion of some shipments that lie outside of the retrieval grid based on their retrieval footprint location and size.

## **Appendix B**

### **Waste Grid Location – Summary and by Waste Type – for the Waste Shipments Contained in the Accelerated Retrieval Project II Retrieval Area Including the Angle of Repose**

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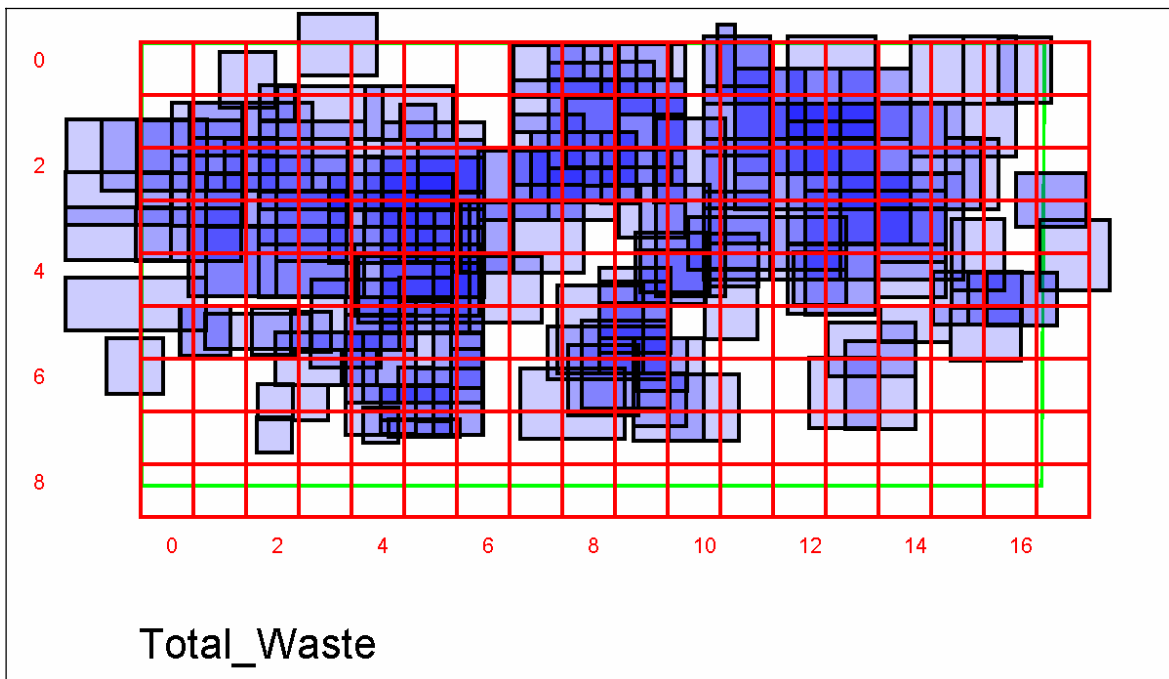


Figure B-1. Shipment locations for all disposals within the ARP II retrieval area including angle of repose.

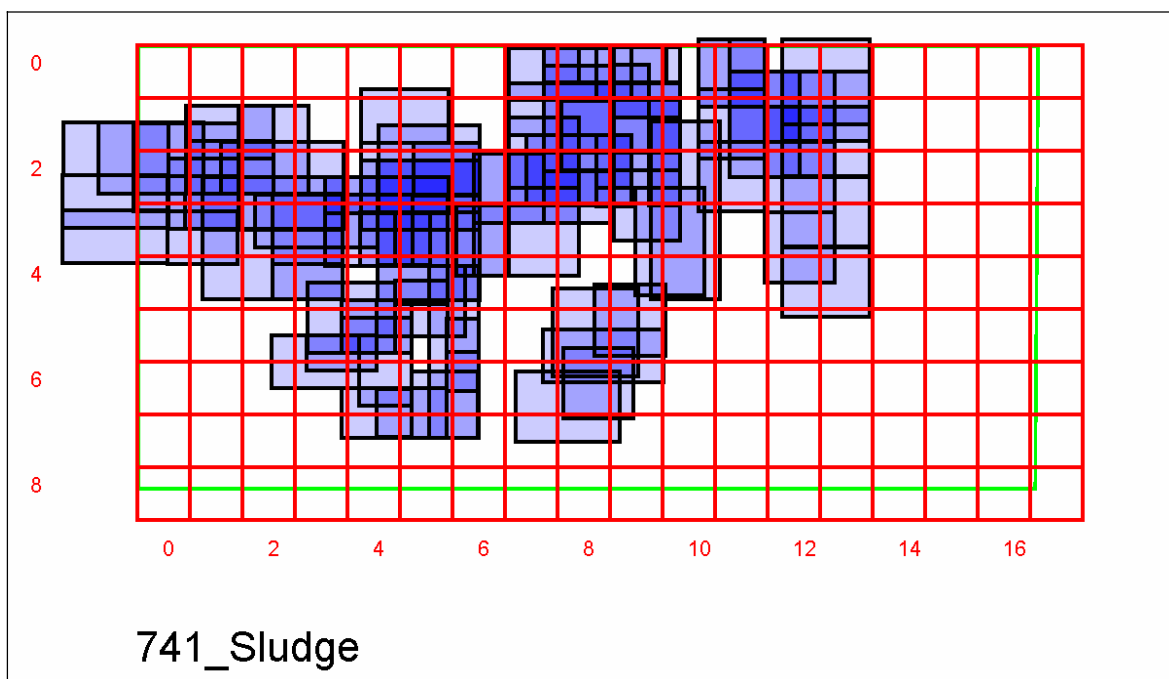


Figure B-2. Shipment locations for disposals containing RFP Series 741 sludge within the ARP II retrieval area.

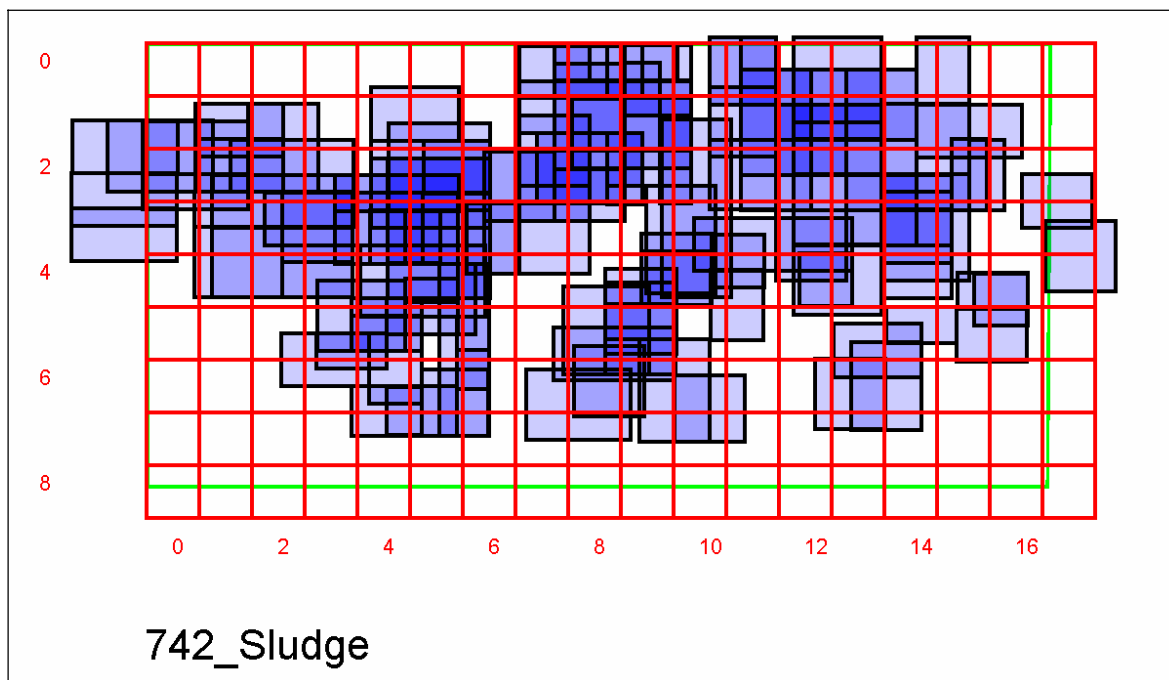


Figure B-3. Shipment locations for disposals containing RFP Series 742 sludge within the ARP II retrieval area.

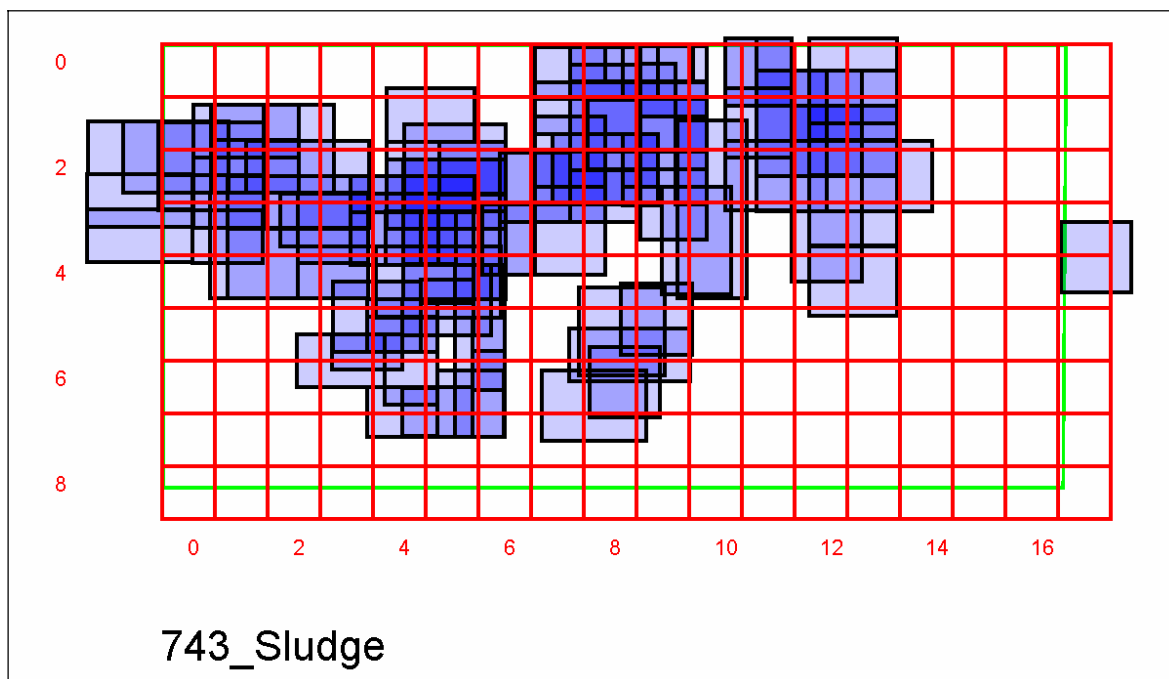


Figure B-4. Shipment locations for disposals containing RFP Series 743 sludge within the ARP II retrieval area.

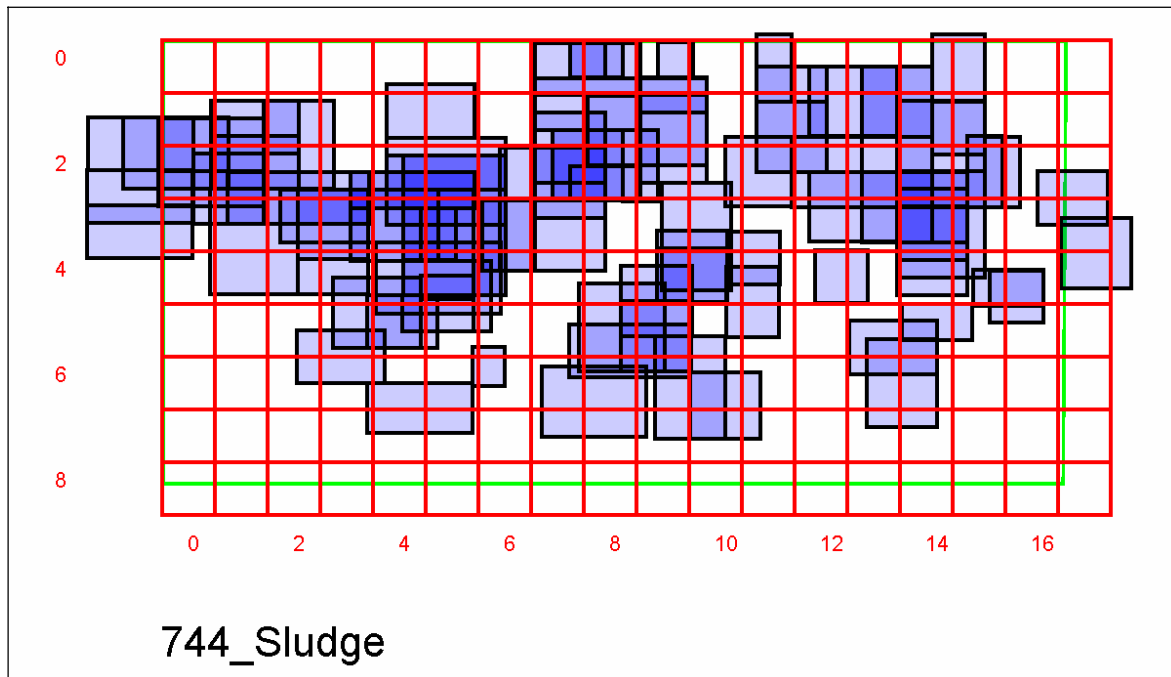


Figure B-5. Shipment locations for disposals containing RFP Series 744 sludge within the ARP II retrieval area.

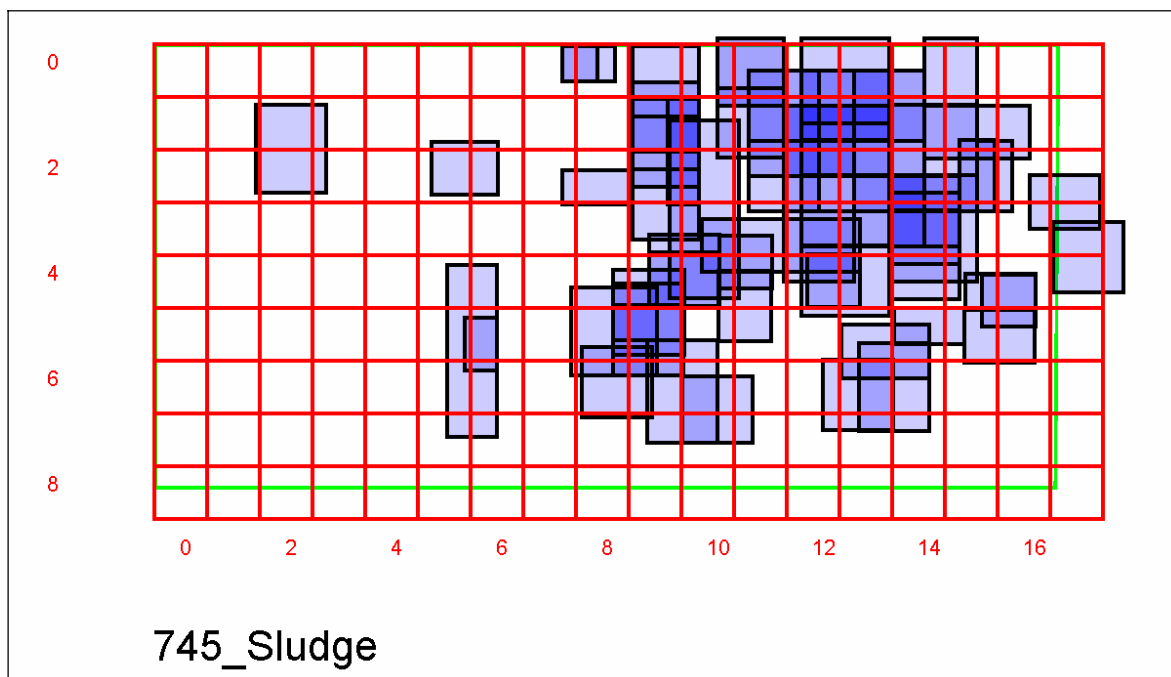


Figure B-6. Shipment locations for disposals containing RFP Series 745 sludge within the ARP II retrieval area.



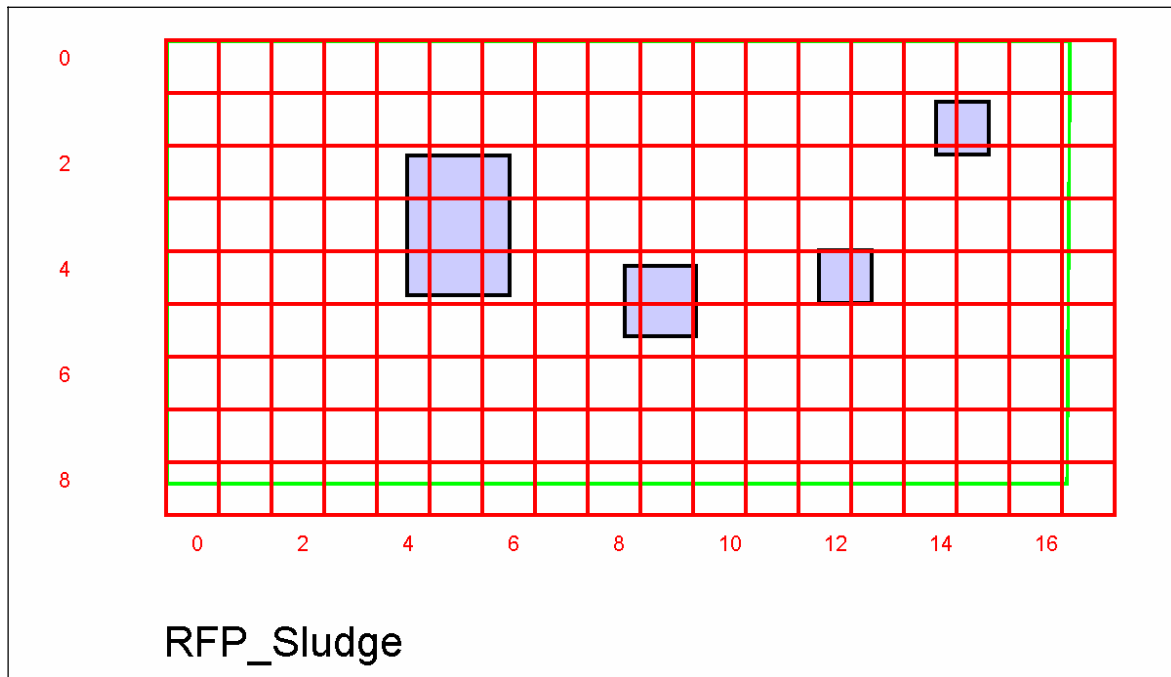


Figure B-7. Shipment locations for disposals containing RFP miscellaneous sludge within the ARP II retrieval area.

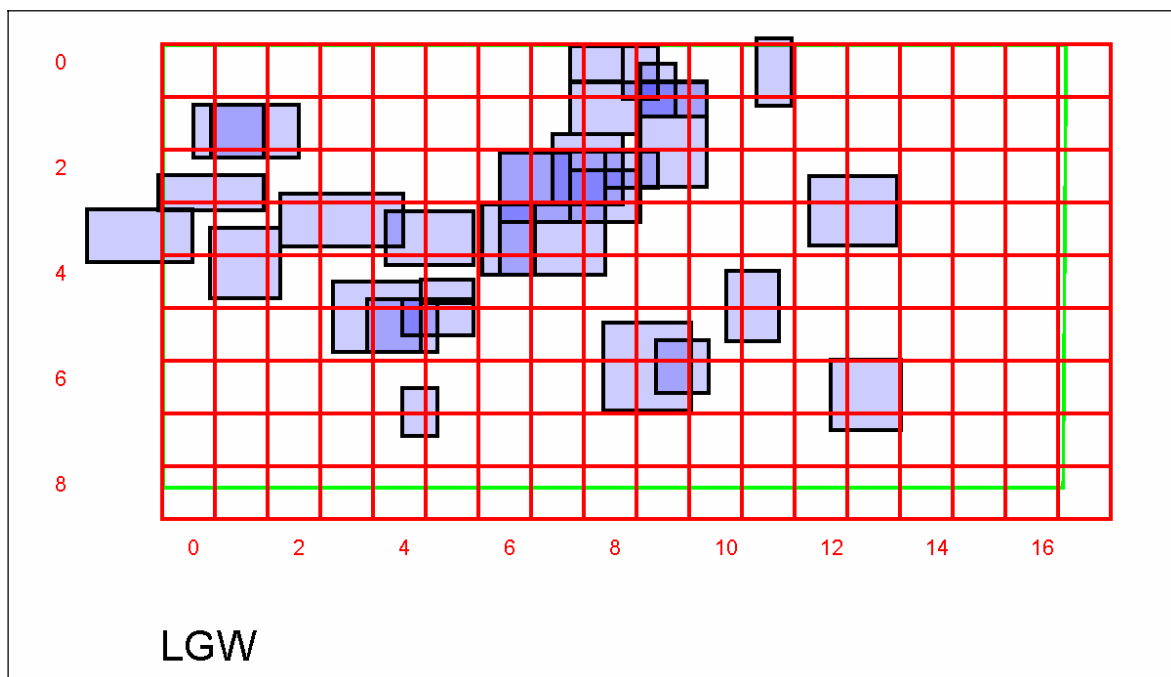


Figure B-8. Shipment locations for disposals containing RFP line-generated waste within the ARP II retrieval area.

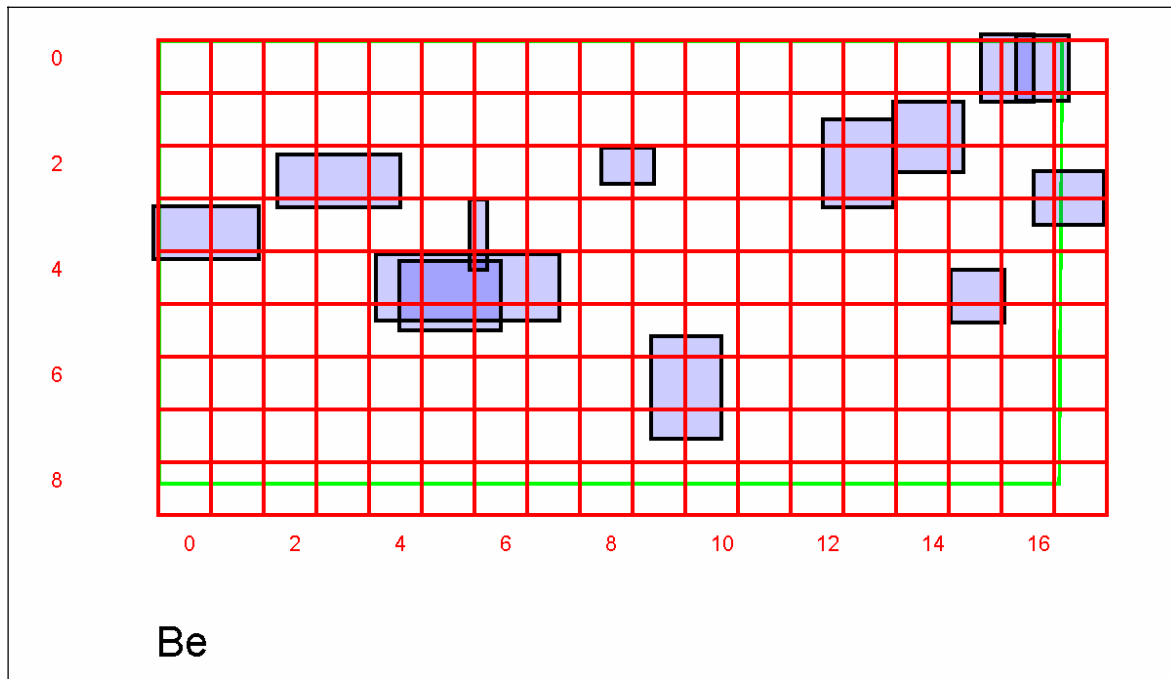


Figure B-9. Shipment locations for disposals containing RFP beryllium-contaminated waste within the ARP II retrieval area.

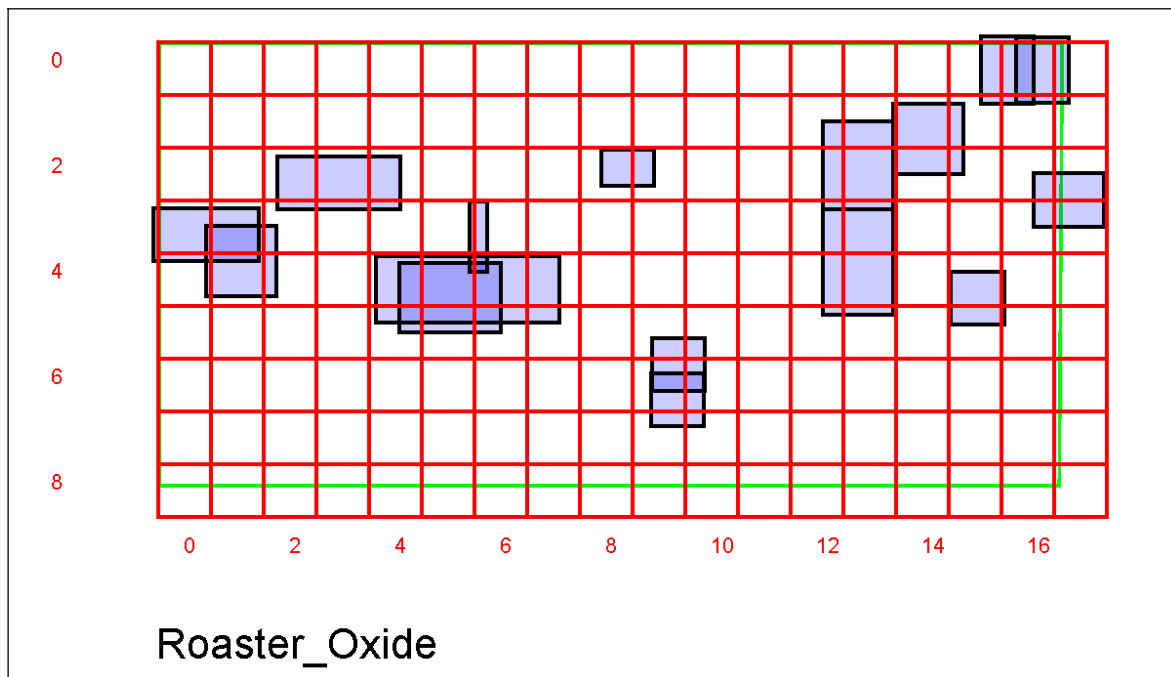
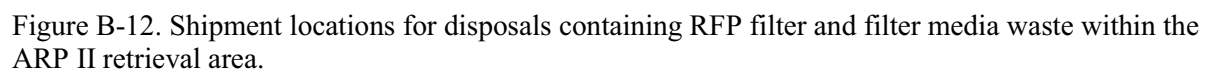
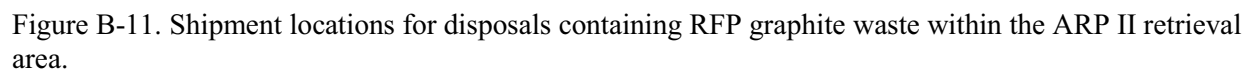


Figure B-10. Shipment locations for disposals containing RFP roaster oxide waste within the ARP II retrieval area.



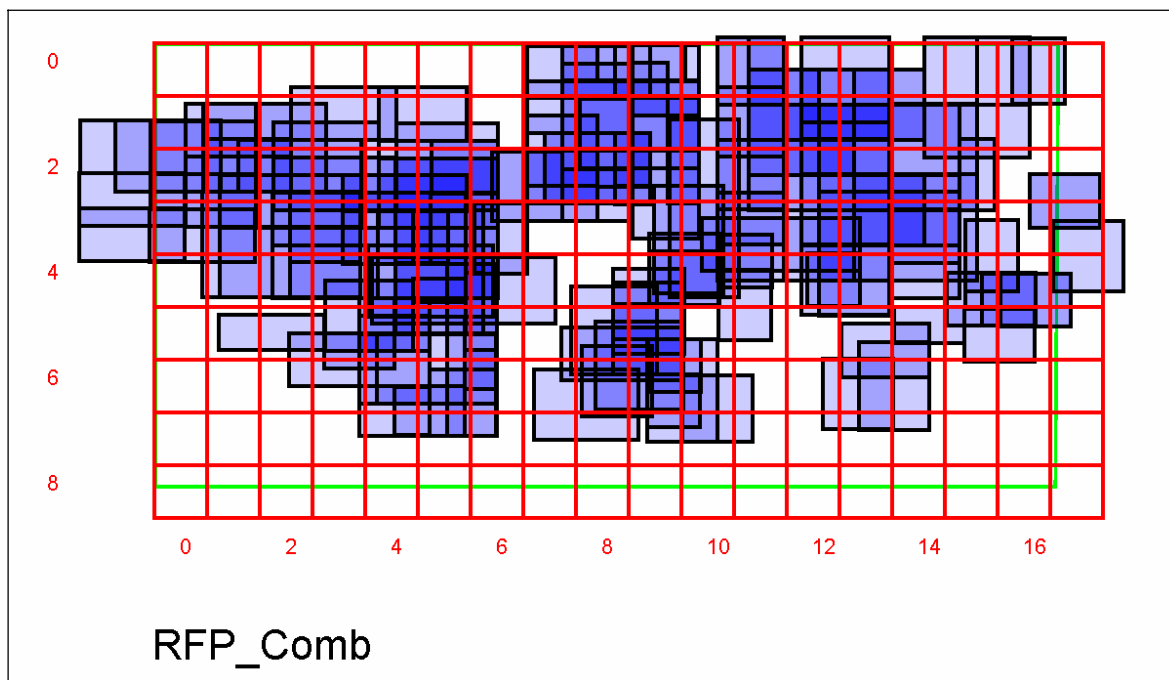


Figure B-13. Shipment locations for disposals containing RFP combustible debris within the ARP II retrieval area.

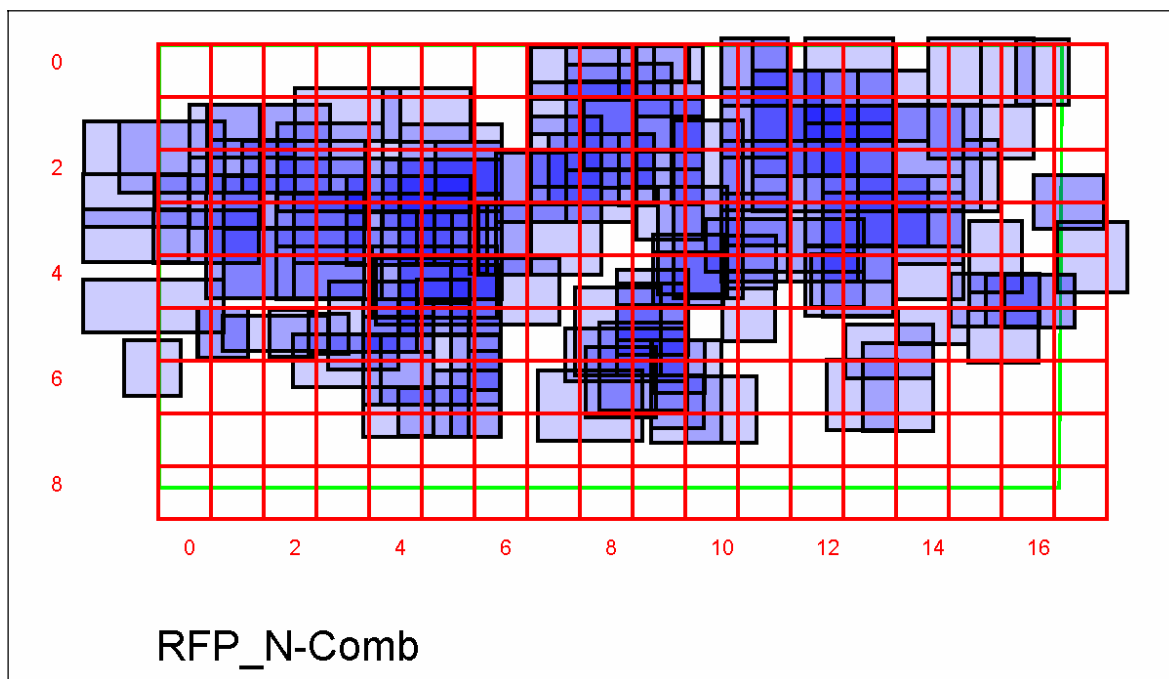


Figure B-14. Shipment locations for disposals containing RFP noncombustible debris within the ARP II retrieval area.

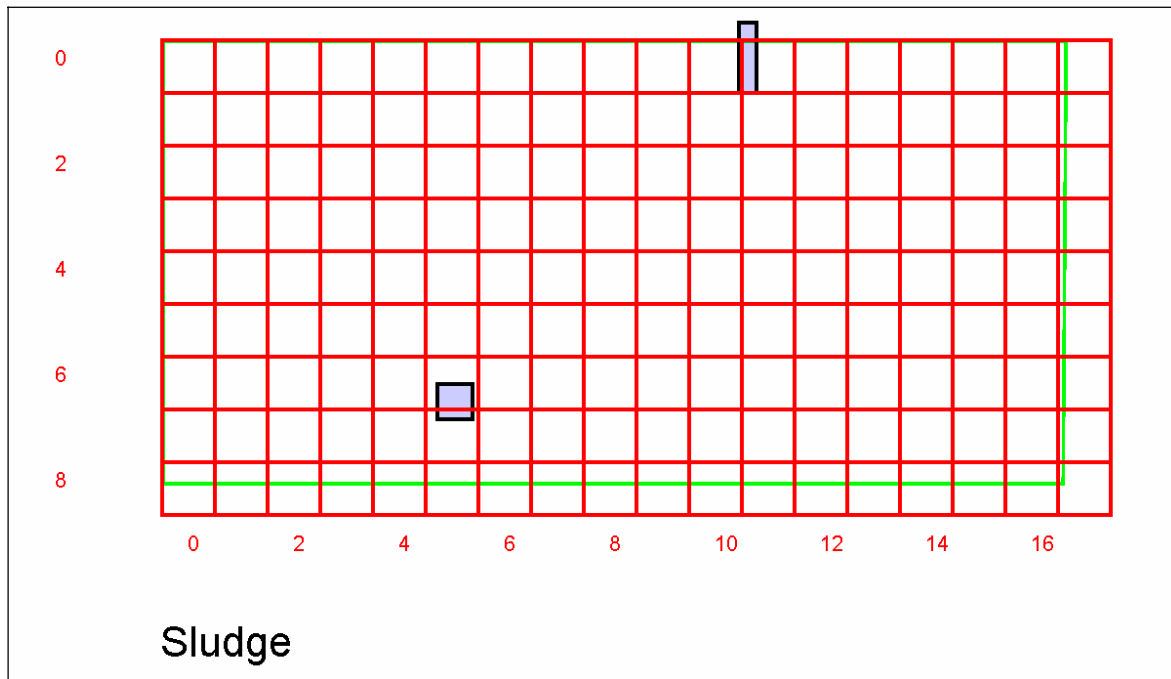


Figure B-15. Shipment locations for disposals containing INL sludge within the ARP II retrieval area.

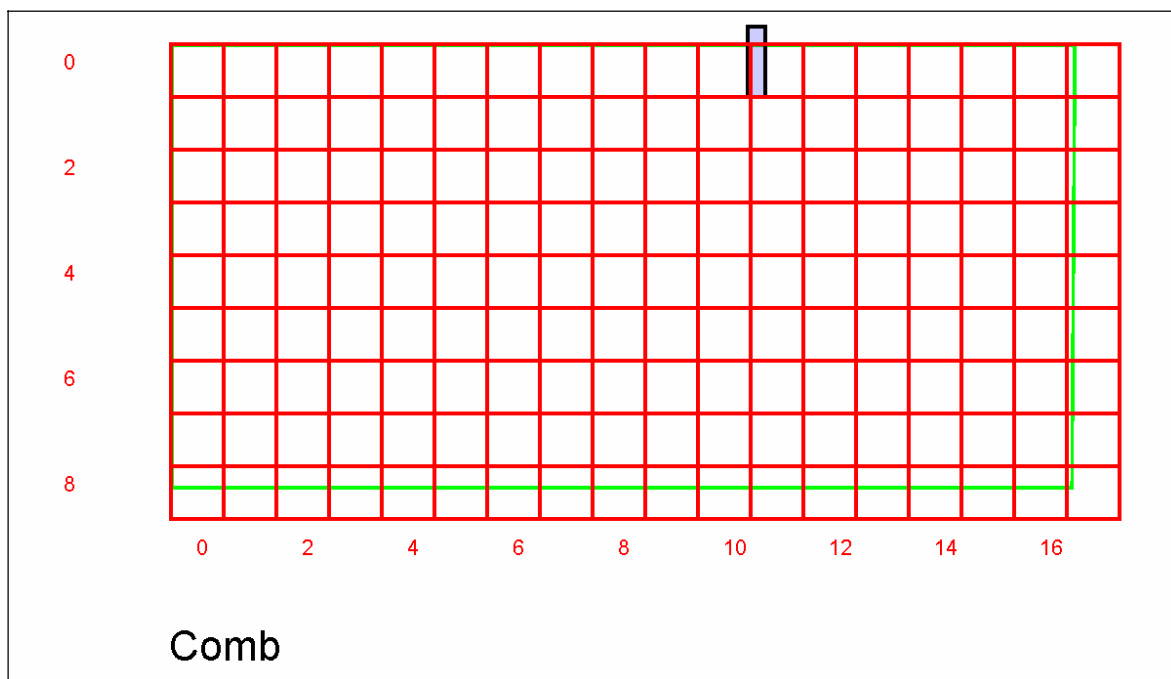


Figure B-16. Shipment locations for disposals containing INL combustible debris within the ARP II retrieval area.

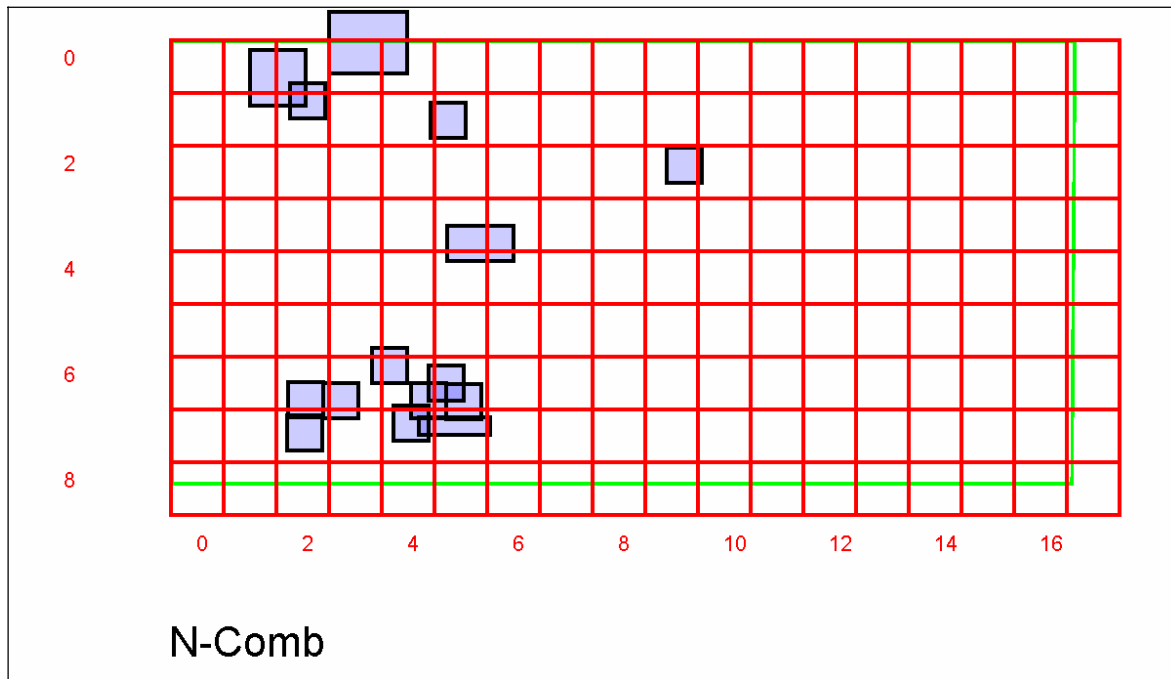


Figure B-17. Shipment locations for disposals containing INL noncombustible debris within the ARP II retrieval area.